Passport 4400

Hardware Installation Manual

Part Number 800-1951-20 Rev. A

June 1998

Notice of Filing

Declaration of CE Conformance (for International sales)

A Declaration of CE Conformance is on file at the Nortel addresses shown below. The declaration lists the models described in this manual. If the unit carries the CE mark, this declaration certifies that it meets the specific EMC standards and safety (LVD) standards required for CE marking. If the product is a module, the module is CE-compliant only if it is placed in a CE-marked base unit.

Nortel
MICOM Communications Corp.
4100 Los Angeles Avenue
Simi Valley, California 93063-3397
U.S.A.
(805) 583-8600

Nortel
MICOM Communications Corp. (Europe) Ltd.
The Granary
Tongham, Surrey GU10 1DW
England, UK
44 1252 781 777

Any units not carrying the CE approval are not CE-compliant. Modules placed in these units may not meet emission standards for CE compliance.

Notice

Specifications, tolerances, and design characteristics described in this manual are subject to change without notice.

Safety Warnings and Cautions

Various safety agencies request statements of warning or caution to help you in the safe operation of the unit. These statements also apply to any and all modules installed within the unit.

To ensure adequate cooling of the equipment a 2.0 inch unobstructed space must be maintained around all sides of the unit.

The ac power socket shall be installed near the equipment and shall be easily accessible.

Installation and access to the interior of this unit shall be made only by a qualified technician.

Connection to the network is to be disconnected before the (mains) plug is removed.

Warning

Remove power plug from the power socket before performing any service work on the unit.

The power supply is auto-ranging in this model.

The power supply cordset to be supplied in Europe must have 0.75^2mm, 3 conductor "HAR" cord type H05VV-F, terminated in a grounding type Shucko plug on one end and a molded-on IEC 320 connector on the other end.

Technical Data

Passport 4400 Series

ac units

Input Voltage:	100-240 Vac -5%, +10%
Input Current:	3A/1.5A
Frequency:	47-63 Hz

dc units

Input Voltage:	36-72 Vdc
Input Current:	5A

Um die Kühlung des Gerätes nicht zu beschränken, ist es notwendig um das Gerät herum an allen Seiten ca 5 cm Raum zu lassen.

Stellen Sie das Gerät in der Nähe einer geerdeten Schutzkontakt- steckdose so auf, dass diese leicht erreichbar und zugänglich ist.

Die Montage und der Zugang ins Innere des Gerätes sind nur einem qualifizierten Techniker gestattet.

Ehe der Netzstecker aus der Steckdose gezogen wird, müssen sämtliche äusserliche Verbindungen vom Gerät getrennt werden.

Warnung

Vor öffnen des Gerätes, muss der Netzstecker aus der Steckdose gezogen werden.

Netzteil ist mit automatischer Umschaltung entsprechend der Versorgungsspannung versorgt.

Die Netzleitung sollte ein harmonisierter Typ (HAR) sein, mit der Bezeichnung H05VV-F oder H05VVH2-F, 3G 0.75^2mm, mit einem Schutzkontakt - und einem Kaltgerätestecker (IEC 320).

Technische Daten

Passport 4400 Series

ac Geraete

Nennspannung:	100-240 V~ -5%, +10%
Nennstrom:	3A/1.5A
Frequenz:	47-63 Hz

dc Geraete

Nennspannung:	36-72 V
Nennstrom:	5A

Pour assurer un refroidissement adéquat, maintenir un espace libre de 5 cm (2 pouces) tout autour de l'appareil.

Installer la prise AC à proximité de l'appareil, dans un rayon d'accès facile.

L'installation et l'ouverture de cet appareil est permise par un technicien autorisé seulement.

Avant de débrancher la prise de courant, assurer que toutes les connexions externes ont été déconnecté de l'appareil.

Avertissement

Débrancher la prise de courant avant d'entreprendre aucun travail de réparation de l'appareil.

Ce modèle s'adapte automatique- ment au courant électrique ou voltage de la prise murale.

En Europe, brancher l'appareil à la prise murale au moyen d'un fil "HAR" comprenant 3 cables H05VV-F ou H05VVH2-F de 0.75^2mm chacun, avec à une extremité une prise de terre genre SHUCKO et à l'autre une prise IEC 320.

Donnees Techniques

Passport 4400 Series

ac appareils

Voltage d'Accès:	100-240 V~ -5%, +10%
Courant d'Accès:	3A/1.5A
Fréquence:	47-63 Hz

dc appareils

Voltage d'Accès:	36-72 V
Courant d'Accès:	5A

Notification of FCC Requirements

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications to this product, that could increase the amount of Radio Frequency Emissions from this product, without the expressed written approval of Nortel/Micom could cause the product and the user to violate the FCC's Rules and Regulations, thus requiring the product to be turned off or disconnected.

If this unit is used on a DTE which requires use of shielded cables for compliance with FCC Part 15, then use of a filtered pin connector may be required to maintain FCC compliance. See the Installation section for specific applications.

Notification of Canadian Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Government of Canada Department of Industry.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Industry du Canada.

United Kingdom Requirement: Interconnection of Ports Warning

Interconnection directly, or by way of other apparatus, of ports marked "SAFETY WARNING. See instructions for use", with ports marked or not so marked may produce hazardous conditions on the network. The advice of a competent engineer must be obtained before such a connection is made. None of the ports provide isolation sufficient to satisfy the relevant parts of BS 6301. Apparatus connected to the ports, must either have been approved to the relevant parts of BS 6301 or to have been previously evaluated against BS 6301 British Telecom Technical Guides 2 or 26, and given permission to attach. Other usage will invalidate any approval given to this apparatus.

Any or all of the ports on the following modules may be configured as non-network ports:

- Base Module: Multiple Configuration Ports
- Up to 4 Voice Modules: Up to 2 Ports
- Legacy Data Module (LDM) and Legacy Data Expansion Modules (LEM)
- High Speed Data Modules (HDM): 4 or 8 Ports

Contents

Who Should Read this Document 1

Introduction — 1

Overview 1-2

Safety Information 1-4

Specifications 1-5
- Base Unit 1-5
- WAN Serial Interface Module 1-11
- 56kbps CSU/DSU Interface Module 1-11
- T1 CSU/DSU Interface Module 1-12
- ISDN S/T Interface Module 1-13
- ISDN U Interface Module 1-13
- High-speed Data Module (HDM) 1-14
- Legacy Data Module/Legacy Data Expansion Module (LDM/LEM) 1-14
- T1 Voice Module (TVM) 1-15
- E1 Voice Module (EVM) 1-16
- Analog Voice Modules (AVM, UAVM) 1-17

Installing the Passport 4400 — 2

Preparing the Site 2-1

Unpacking the 4400 2-3

Passport 4400 Rack Installation 2-3

Powering Up an ac Unit 2-5

Powering Up a dc Unit 2-6

Verifying Operation 2-7

Reset Switch 2-8

Connecting the Ethernet Base Module — 3

Frame Relay DCE Serial Access Port (Port 1) 3-2

Management Port 3-4

Ethernet Access Ports 3-5

Interface Module Connectors 3-6

Connecting the Expansion Modules — 4

High-speed Data Module (HDM) 4-1

Legacy Data Module (LDM) and Legacy Data Expansion Module (LEM) 4-3

T1 Voice Module (TVM) 4-5

E1 Voice Module (EVM) 4-6

Analog Voice Module (AVM) 4-7

Universal Analog Voice Module (UAVM) 4-9
- Use of Terminal Block 4-10

Ethernet Base Module and Interface Modules — 5

Interface Modules 5-2
- WAN Serial Interface Module 5-3
- 56kbps CSU/DSU Interface Module 5-4
- T1 CSU/DSU Interface Module 5-5
- ISDN Interface Module 5-6

Installing Expansion (Data and Voice) Modules — 6

Safety Information 6-1

Notice of Electromagnetic Compatibility (EMC) 6-1

Module Stacking Order 6-2
- Determining the Logical Interface Module (LIM) Identifier 6-2
- Setting the Switchbank 6-3

Stacking Connectors 6-4

Back Panel Grounding Clips 6-4

Spacers 6-5

Blank Back Panels 6-5

Installing an Expansion Module 6-6

Data Modules — 7

High-speed Data Module 7-1

Low-speed Data Services Modules 7-3
- Connectors 7-4

Analog Voice Modules — 8

Universal Analog Voice Module (UAVM) 8-1
Removing an Interface Module 8-3
Inserting an Interface Module 8-4
Interface Modules 8-5

Analog Voice Module (AVM) 8-13
Strapping 8-14

T1/E1 and Digital Voice Modules — 9

T1 and E1 Voice Modules 9-1
Strapping 9-4

Digital Voice Expansion Module (DVEM) 9-6

Digital Voice Module (DVM) 9-8
Installing Digital Voice Modules 9-8

Power Supplies — 10

dc Power Supplies 10-1

Chassis types 10-2
Three-slot Chassis (model 4430) 10-2
Five-slot Chassis (model 4450) 10-3
Five-slot Chassis with Redundant Power Supply (model 4450R) 10-4

Configuring the Power Supplies 10-5

Indicators — 11

Ethernet Base Module 11-1

T1/E1 Voice Module 11-2
Digital Voice Channel Status Indicators 11-2
T1/E1 Status Indicators 11-3

Digital Voice Expansion Module 11-5

Analog Voice Module and Universal Analog Voice Module 11-6

Cable Diagram Pin Assignments A

About this document

This document contains detailed information about the hardware components that make up the Passport 4400 device. It describes the 3- and 5-slot chassis, the ethernet base card, and all optional modules. Cabling information is included, as is a discussion of system indicators and warning signals.

Who Should Read this Document

This document is intended for anyone responsible for installing and upgrading Passport 4400 units and their hardware components.

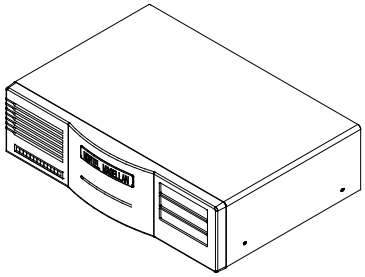
Introduction 1

Passport 4400 devices are multimedia, frame relay access devices deployed as an overlay to an existing Passport frame relay network. In this configuration, Passport 4400 units form distinct networks in which separate units communicate using switched virtual circuits (SVCs) provided by the Passport backbone. This arrangement allows small branch sites to consolidate multimedia traffic (such as voice and LAN) over a single low-speed network link (operating at speeds such as 56 or 64 kbps) and pass traffic through regional concentration sites served by Passport.

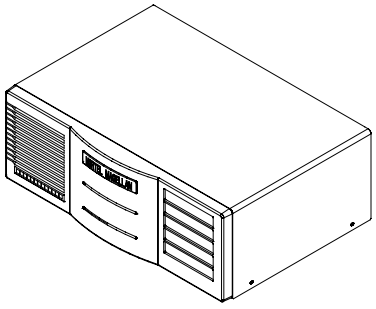
Once deployed and provisioned, Passport 4400 units provide the following services:

- voice, fax, and modem services via four different voice modules
- LAN services such as bridging and routing IP and IPX protocols
- Frame Relay DCE services.

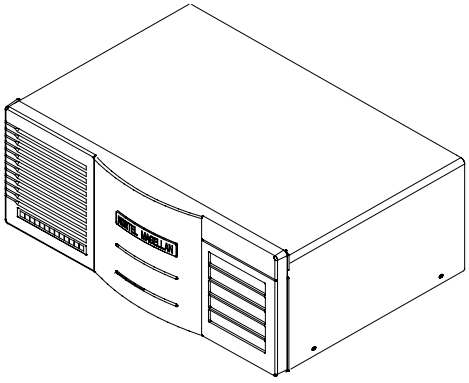
In this manual, the Passport 4400 unit may be referred to as the 4400.



Model 3e



Model 5e



Model 5eR with Redundant Power Supply

Figure 1-1. Passport 4400 Models

Overview

The mix of hardware and functions in each Passport 4400 unit depends on the application and site requirements. The major hardware components of the 4400 are described in this section. The 4400 consists of the following hardware components:

- 3- or 5-slot chassis.

Passport 4400 units are available for use with either ac or dc current, and a redundant power supply option is available on the 5-slot models. Passport 4400 units are available in the following configurations:

- 4430ac, 3-slot, Ethernet interface, ac power
- 4450ac, 5-slot, Ethernet interface, ac power
- 4450dc, 5-slot, Ethernet interface, dc power
- 4450acR, 5-slot, Ethernet interface, ac power with redundant power supply
- 4450dcR, 5-slot, Ethernet interface, dc power with redundant power supply.

The chassis houses the modules that provide the various access services offered by the 4400. The number of slots indicates the maximum number of modules, including the base module, that can be supported by each unit.

Ethernet Base Module

The Ethernet Base Module performs central processing functions for the 4400. This module must be present in the lowest slot in the unit for any of the other modules to function.

The Ethernet Base Module includes the following:

- processor and memory
- serial access port
- management port
- AUI and 10BaseT Ethernet interfaces
- optional plug-in interface modules.

Data Modules

The Passport 4400 supports two types of data modules:

- High-speed Data Module
- Low-Speed Data Services Modules.

The High-speed Data Module (HDM) provides additional port capability, identical to Port 1 on the Ethernet Base Module. The module supports RS-232, V.35, V.36, and X.21 interfaces, determined by the cable used. The HDM can support both DTE and DCE modes.

Low-Speed Data Services Modules include the Legacy Data Module (LDM) and the Legacy Data Expansion Module (LEM). The LDM and LEM provide legacy protocol for branch sites connected to a Passport only network. These include FR, X.25, ITI, tr, SNA, SDLC, DTDS, HTDS. The LDM provides six legacy services ports; the LEM provides an additional eight ports.

Analog Voice Modules

Two types of analog voice modules are available to provide analog voice support for the Passport 4400:

- Analog Voice Module (AVM)
- Universal Analog Voice Module (UAVM).

Both modules support Foreign Exchange Station (FXS), Foreign Exchange Office (FXO), and Ear and Mouth (E&M) connections.

Digital Voice Modules

The Passport 4400 unit supports the T1 Voice Module (TVM) and E1 Voice Module (EVM) with digital voice connections. One Digital Voice Module (DVM) must be inserted in the TVM or EVM for each digital voice channel required. To provide full T1 or E1 support, the Digital Voice Expansion Modules (DVEM) provide additional slots for DVMs as required.

Safety Information

Underwriters Laboratories, Inc. (UL), the Canadian Standards Association (CSA), and TÜV for Germany request that the following statements of warning be made in three languages to help in the safe operation of the unit.

Caution: (English text UL/CSA, German text TUV, French text CSA)

Access to the interior of this unit shall be made only by a qualified technician or Northern Telecom trained personnel.

Connection to the network is to be disconnected before the main plug is removed.

Der Zugang ins Innere des Gerätes ist nur einem qualifizierten Techniker gestattet.

Ehe der Netzstecker aus der Steckdose gezogen wird, müssen sämtliche äusserliche Verbindungen vom Gerät getrennt werden.

Ouverture de cet appareil est permise par un technicien autorisé seulement.

Avant de débrancher la prise de courant, assurer que toutes les connexions externes ont été déconnecté de l'appareil.

> ***Warning:*** WARNUNG, AVERTISSEMENT
> Remove power plug from the power socket, or disconnect dc power, before performing any service work on the unit.
> Vor öffnen des Gerätes, muss der Netzstecker aus der Steckdose gezogen werden.
> Débrancher la prise de courant avant d'entreprendre aucun travail de réparation de l'appareil.

When working inside the unit, be sure to take all precautions against electrostatic discharge:

- Wear a grounding strap to protect the equipment while the unit is open.
- To discharge any buildup of static electricity, touch any metal part of the unit before handling any module.
- Avoid working on carpet.

Specifications

Note: Model numbers listed with a lowercase "x" indicate a revision number for the selected model. For instance, model number NTAU03xx represents all model numbers that begin with NTAU03.

Base Unit

Physical Dimensions

3-slot Unit

Width	18 inches (45.7 cm)
Height	5 inches (12.7 cm)
Depth	12.75 inches (32.4 cm)

5-slot Unit

Width	18 inches (45.7 cm)
Height	7.75 inches (19.7 cm)
Depth	12.75 inches (32.4 cm)

5-slot Unit with Redundant Power Supply

Width	18 inches (45.7 cm)
Height	8.25 inches (21.0 cm)
Depth	12.75 inches (32.4 cm)

Operating Environment

Temperature

Operating 32 to 122°F (0 to 50°C)
Storage -40 to 158°F (-40 to 70°C)

Relative Humidity

Operating 10-90% non-condensing
Storage 0-95% non-condenseing

Power Requirements

ac: 100-240 volts ac, -5%, +10%
43-63 Hz, 160 Watts maximum
(model 4430ac – 135 Watts max.)

dc: 36-72 volts dc
@ 3A maximum

Agency Compliances

Safety

UL 1950
CSA Standard C22.2 No. 950
IEC 950
TUV: EN60950
EN41003
BABT 340 (where applicable)

Electromagnetic Compatibility

FCC Part 15, Level A (T1 only)
C.R.C., c, 1374 (T1 only)
EN 55022
CISPR 22, class A
IEC 801-2:1991/prEN55024-2:1992, 3KV, CD, 8KV DA
IEC 801-3:1984/prEN55024-3:1991, 3 V/m
IEC 801-3:1988/prEN55024-4:1993, 0.5KV Signal, 1KV Power
EN 60555

EU Declaration of Conformity

Safety: Directive: 73/23/EEC
EMC: Directive 89/336/EEC

Telecommunications Requirements

The following information applies only to Passport 4400 units that are connected to a telephone network.

Repair Instructions

If you experience trouble with this equipment, follow this procedure:

1. Determine whether the problem is your data terminal equipment. If you have another data terminal equipment, connect it in place of the inoperative unit to see if the data terminal equipment or the line is at fault.
2. If you find the problem is in your Nortel equipment, contact your customer service representative.

> ***Warning:*** Do not attempt to repair the unit. Attempting to repair the unit may cause injury, and may also damage equipment on the telephone network. Attempts to repair the unit are violations of FCC rules. Repair to this equipment can only be made by the manufacturer, and its authorized agents, and by others who may be authorized by the FCC.

The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning.

User's Responsibility

You must supply the following information upon request:

- Whether the notification is about a connection or disconnection
- The manufacturer of the device – Northern Telecom
- Model number of the device:
  - Passport 4430ac: QMY922x
  - Passport 4450ac: QMY923x
  - Passport 4450acR: QMY924x
  - Passport 4450dc: QMY926x
  - Passport 4450dcR: QMY927x
- FCC Part 68 (U.S.A. T1) – see label on card for registration number
- DOC CS-03 (Canada) – see label on card for registration number
- Jack to be used – RJ48C or RJ11.

In addition to the above information you will be required to supply the following supplemental information if your system is an XD, DD, DE or OT requiring three or more C.O. lines:

- Sequence in which the trunks are to be connected
- Facility interface codes by position
- Service order codes by position.

Note: The FCC registration label includes the ringer equivalence, because at the time FCC Part 68 was established, digital systems without ringing had not been established. Even though the ringer equivalence must appear on the label, it is inconsequential in the case of digital communications.

Connection of this unit to the nationwide telecommunications network must be through a standard network interface jack (RJ48C or RJ11) which must be ordered from the telephone company.

Telephone Company Rights and Responsibilities

If your data terminal equipment causes harm to the telephone network the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be given the opportunity to correct the situation, and you will be informed of your right to file a complaint with the regulatory agency.

Your telephone company may make changes in its facilities, equipment, operation, or procedures that could affect the proper functioning of your data communications equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted service.

FCC Requirements

You must notify the telephone company whenever the Passport 4400 is connected to or disconnected from a telephone company line. This equipment complies with the Federal Communications Commission (FCC) Rules. On the back of this equipment is a label that contains, among other information, the FCC registration number.

Equipment Attachment Limitations for Operation in Canada

CP-01, Part I, Section 10.1

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In

some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

> ⚠ ***Caution:*** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

CP-01, Part I, Section 10.2

NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

Affidavit Requirements for Connections to Digital Services (US)

- An affidavit must be served to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voice band analog signals and retransmitted on the network.
- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the out put of the device meets Part 68 encoded analog content or billing protection specification.
- The end user will be responsible for filing an affidavit with the local exchange carrier when connecting unprotected CPE to 1.544 Mbps or to Subrate digital services.
- Until such time as subrate terminal equipment is registered for voice applications, the affidavit requirement for subrate services is waived.

AFFIDAVIT FOR CONNECTION OF CUSTOMER PREMISES EQUIPMENT TO 1.544 MBPS AND/OR SUBRATE DIGITAL SERVICES

For the work to be performed in the certified territory of _____(Telco Name), State of_____, county of_____,
I,_____(name), _____(business address)_____(telephone number) being duly sworn, state:
I have responsibility for the operation and maintenance of the terminal equipment to be connected to _____1.544 Mbps and/or _____Subrate digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specifications with respect to analog content and billing protection:
( ) I attest that all operations associated with the establishment, maintenance, and adjustment of the digital CPE with respect to encoded analog content and encoded billing protection information continuously complies with Part 68 of the FCC Rules and Regulations.
( ) The digital CPE does not transmit digital signal containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.
( ) The encoded analog content and billing protection is factory set and is not under the control of the customer.
I attest that the operator(s)/maintainer(s) of the digital CPE responsible for the establishment, maintenance, and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):
( )_____a. A training course provided by the manufacturer/grantee of the equipment used to encode analog signals; or
( )_____b. A training course provided by the customer or authorized representative using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals; or
( )_____c. An independent training course (e.g., trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signal; or
( )_____d. In lieu of the preceding training requirements, the operation(s)/maintainer(s) is (are) under the control of a supervisor trained in accordance with _____(circle one) above.

I agree to provide_____(telco's name) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.
_____(signature)
_____(title)
_____(date)
Subscribed and Sworn to before me this _____day of_____,(year)

_____
Notary Public
My commission expires:

WAN Serial Interface Module

Specifications apply to the WAN Serial Interface Module as part of the Passport 4400 unit.

Agency Compliances

Safety

UL 1950
CSA Standard C22.2 No. 950
IEC 950
TUV: EN 60950

Telecom Requirements

BABT: CTR-2

56kbps CSU/DSU Interface Module

Specifications apply to the 56kbps CSU/DSU Interface Module as part of the Passport 4400 unit.

Agency Compliances

Safety

UL 1950
CSA Standard C22.2 No. 950

Telecommunication Requirements

You must supply the following information upon request:

- Whether the notification is about a connection or disconnection
- The manufacturer of the device – Northern Telecom
- Model number of the device – NTAU02xx.

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

T1 CSU/DSU Interface Module

Specifications apply to the T1 CSU/DSU Interface Module as part of the Passport 4400 unit.

Agency Compliances

Safety

UL 1950: 1993 (T1 only)
CSA Standard C22 (T1 only)

User's Responsibility

This equipment is limited for use on T1 Digital Service lines only. If a need arises in the future, the telephone company will call you and request the following information:

- The manufacturer of the device – Northern Telecom
- Model number of the device – NTAU04xx
- FCC Part 68 (U.S.A. T1) – see label on card for registration number.
- DOC CS-03 (Canada) – see label on card for registration number.
- Type of interface – 1.544 Mbps digital with D4 or ESF framing format
- Jacks which may be used – RJ48C
- Facility interface codes:
  - 04DU9-BN
  - 04DU9-DN
  - 04DU9-1KN
  - 04DU9-1SN
- Service order code – 6.0F.

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

ISDN S/T Interface Module

Specifications apply to the ISDN S/T Interface Module as part of the Passport 4400 unit.

Agency Compliances

Safety

IEC 950
TUV: EN 60950
EN 41003

Telecom Requirements

CETECOM: CTR-3 Standard

ISDN U Interface Module

Specifications apply to the ISDN U Interface Module as part of the Passport 4400 unit.

Agency Compliances

Safety

UL 1950
CSA Standard C22.2 No. 950

Telecom Requirements

BABT: CTR-2

User's Responsibility

You must supply the following information upon request:

- Whether the notification is about a connection or disconnection
- The manufacturer of the device – Northern Telecom
- Model number of the device:
  - ISDN BRI U Interface: NTAU05xx
  - ISDN BRI S/T Interface: NTAU06xx.

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

High-speed Data Module (HDM)

Agency Compliances

Electromagnetic Compatibility

FCC Part 15, Level A (T1 only)
C.R.C., c, 1374 (T1 only)
EN 55022
CISPR 22, class A
IEC 801-2:1991/prEN55024-2:1992, 3KV, CD, 8KV DA
IEC 801-3:1984/prEN55024-3:1991, 3 V/m
IEC 801-3:1988/prEN55024-4:1993, 0.5KV Signal, 1KV Power
EN 60555

Telecom Requirements

BABT: CTR-2 Standard

Legacy Data Module/Legacy Data Expansion Module (LDM/LEM)

Agency Compliances

Electromagnetic Compatibility

CISPR 22 Class A
FCC Class A, Part 15, subpart B
CSA C108 Class A for radiated and conducted emissions

Telecom Requirements

BABT: CTR-2 Standard

T1 Voice Module (TVM)

Agency Compliances

Safety

EN 41003 :1993
EN 60950:1992 +A1 +A2

Electromagnetic Compatibility

EN 55022 :1994 class A
EN 50082 -2, -3, -4 :1995
FCC Part 15, class A
CISPR22, class A

Limitations

This equipment is intended for use on T1 Digital Service lines ONLY.

User's Responsibility

If a need arises in the future, the telephone company will call the user and request the following information:

- Model number of the device – NTAY14xx
- FCC Part 68 Registration Number: BEBUSA-23238 - DE-N
- Type of Interface:
  - 1.544 digital interface with D4 framing format
  - 1.544 digital interface with ESF framing format
- Jacks provided: RJ48C (2)
- Facility Interface Code (FIC):
  - 04DU9-BN
  - 04DU9-DN
  - 04DU9-1KN
  - 04DU9-1SN
- Service Order Code: 6.0F.

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

E1 Voice Module (EVM)

Agency Compliances

Safety

EN 41003 :1993
EN 60950:1992 +A1 +A2

Telecom Requirements

CTR/TBR13 BABT - Pan European CE-Mark 120 Ohm Structured Leased Line Interface
U.K. Only 75 Ohm Structured

Electromagnetic Compatibility

EN 55022 :1994 class A
EN 50082 -2, -3, -4 :1995
FCC Part 15, class A
CISPR22, class A

Limitations

This equipment is intended for use on E1 Digital Service lines ONLY.

User's Responsibility

If a need arises in the future, the telephone company will call the user and request the following information:

- Model number of the device – NTAY16xx
- BABT Certificate Number AA606-535
- Type of Interface – 2.048 Mbps digital interface
- Jacks provided:
  - — 75 W BNC (4)
  - — 120 W DB9 (2).

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

Analog Voice Modules (AVM, UAVM)

Agency Compliances

Safety

UL 1950:1993
CSA Standard C22.2 No. 950:1993
IEC 950:1991+A1:1992
TUV: EN 60950:1992
EN 41003:1993
BABT 340: Sixth Edition (Manufacturing)

Electromagnetic Compatibility

FCC Part 15, class A
C.R.C., c, 1374
CISPR 22, class A
EN 55022
EN 50082-1:1992
IEC 801-2:1991/prEN55024-2:1992, 3KV CD, 8KV AD
IEC 801-3:1984/prEN55024-3:1991, 3 V/m
IEC 801-4:1988/prEN55024-4:1993, 0.5KV Signal, 1KV Power

EU Declaration of Conformity

Safety: Directive: 73/23/EEC
EMC: Directive: 89/336/EEC
Telecom Terminal Equipment
United Kingdom
General:BS6450
FXO: BS6305 (1982)

User's Responsibility

If a need arises in the future, the telephone company will call the user and request the following information:

- Model number of the device(s):
  - Single-channel AVM: NTAU61xx
  - Dual-channel AVM: NTAU62xx
  - UAVM: NTAU50xx
  - FXO module for UAVM: NTAY11xx
  - FXO module for UAVM (approved for Spain, Sweden, Switzerland, Netherlands, and France): NTLN23xx
  - FXS module for UAVM: NTAY12xx
  - E&M module for UAVM: NTAY09xx
- FCC Part 68 (U.S.A): BEBUSA 75539-PX-N (AVM: all, UAVM: FXO and E&M only)
- DOC CS-03 (Canada): AVM: 5681A (1 ch) and 7073A (2 ch), UAVM: 680-5681A (FXO and E&M interfaces only)
- Jacks, Facility Interface Codes, Service Order Codes, and Ringer Equivalence: See below.

AVM E&M

USO Jack: RJ1CX

Facility Interface Code:

- TL11M/E 2-Wire
- TL12M/E 2-Wire
- TL31M/E 4-Wire
- TL32M/E 4-Wire

AVM FXS

USO Jack: RJ11C/W

Facility Interface Code: OL13C 2-Wire

Service Order Code: 9.0F

AVM FXO

USO Jack: RJ11C/W

Facility Interface Code: O2LS2 2-Wire

Service Order Code: 9.0F

Ringer Equivalence: 0.9B

UAVM FXO

USO Jack: RJ11C

Ringer Equivalence: 0.9B

Please refer to **Telecommunication Requirements**, page 1-7, for more information.

Registration

UAVM only: The FXO and E&M interfaces are registered with the FCC based upon compliance with Part 68 of its rules. The FXS interface is not registered with the FCC. Therefore, this interface cannot be connected to the public network.800-1943-20 Rev. AFCC registration does not constitute an expressed or implied guarantee of performance. Only the warranty set forth in this manual covers the performance of this equipment.

Warning: WARNUNG
The connection to the public network is performed via a supplied RJ12-TAE 6F cable. No other device can be connected to that line.
Der Anschluss an das Waehlnetz der Deutschen TELEKOM AG erfolgt mittels eines beigefuegten RJ12-TAE 6 F Kabels. Die Konfiguration sieht vor, dass kein Geraet an den TAE F Anschluss moeglich ist.

Installing the Passport 4400 2

This section describes the procedures used to set up and connect a configured Passport 4400.

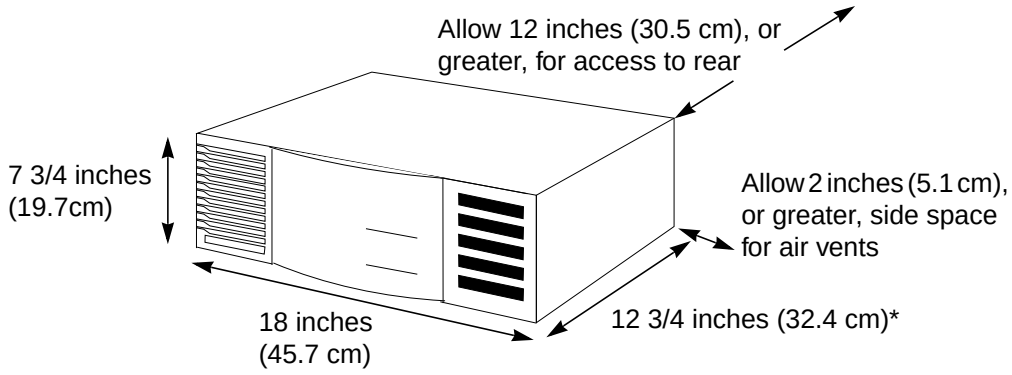
Note: For the purposes of this document, the term “configured” refers to the Passport 4400 unit in which all expansion modules have been previously installed and operational.

Preparing the Site

Before connecting the 4400, select a location that conforms to the following environmental requirements:

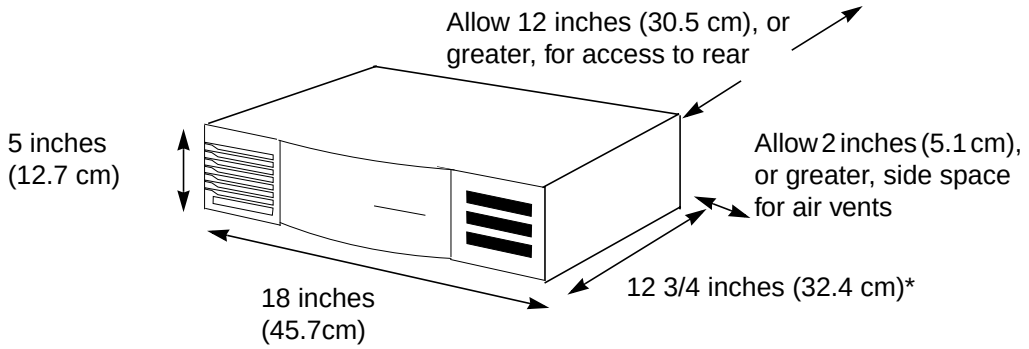
- space requirements (Figure 2-1).
- surrounding temperature (Table 2-1).
- distance to the ac socket (if unit is ac-powered) – the supplied power cord is 6 feet (1.8m) long.

Note: For information about installing the Passport 4400 in a rack, see **Passport 4400 Rack Installation**, below.


Allow 12 inches (30.5 cm), or greater, for access to rear
7 3/4 inches (19.7cm)
Allow 2 inches (5.1 cm), or greater, side space for air vents
18 inches (45.7 cm)
12 3/4 inches (32.4 cm)*

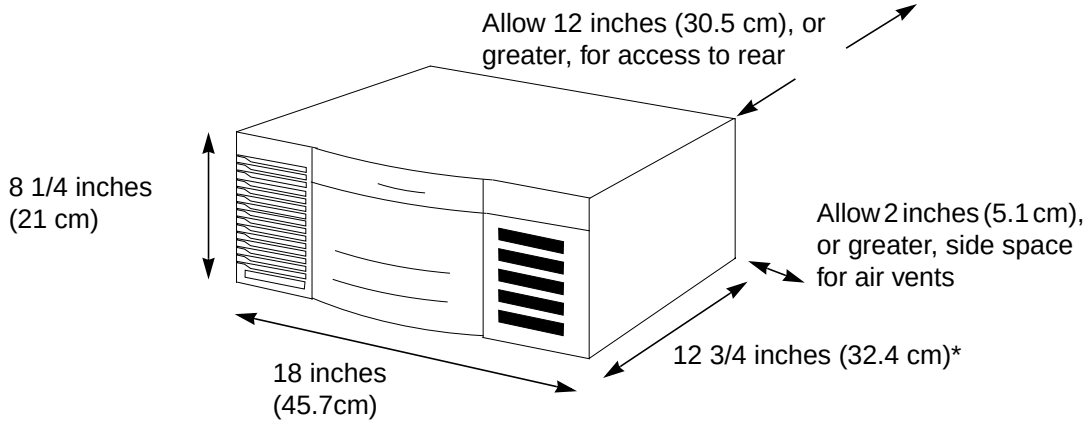
*For dc models, add 2 1/4 inches (5.7 cm)

Figure 2-1. Space Requirements for a 5-Slot Standard Passport 4400 Unit



*For dc models, add 2 1/4 inches (5.7 cm)

Figure 2-2. Space Requirements for a 3-Slot Passport 4400 Unit



*For dc models, add 2 1/4 inches (5.7 cm)

Figure 2-3. Space Requirements for a 5-Slot Redundant Power Supply Passport 4400 Unit

Table 2-1. Passport 4400 Environmental Specifications

Environmental factor	Conditions
Temperature	Operating: 32° to 122°F (0 to 50°C)
	Storage: -40° to 158°F (-40° to 70°C)
Relative humidity	Operating: 10% to 90% (non-condensing)
	Storage: 0% to 95% (non-condensing)

Unpacking the 4400

Procedure 1: Unpacking the 4400

1. Read the labels on the box, then open the box.

   Note: Make sure that you keep the packing list included. It contains model numbers and information about the Passport 4400 unit and all included modules.

2. Remove the shipping material and any modules shipped in the box along with the Passport 4400 unit. Place these modules on a table near the installation site.

3. Slowly ease the Passport 4400 unit out of the carton by firmly gripping its sides and lifting straight up.

   Note: Be sure to use proper lifting technique when removing the Passport 4400 unit from the carton. Do not bend over at the back when lifting.

4. Place the equipment out on a table close to the installation site.

5. Check the packing list against the contents. Report any damage to the shipping carrier.

6. Save the packing materials in case you need to move the unit.

Once the carton is unpacked, verify that you have received all the equipment you have ordered.

Passport 4400 Rack Installation

The Passport 4400 may be installed in a rack using an available Passport 4400 rackmount kit. Please consult 800-1959-20, *Passport 4400 Ordering Catalog*, for model numbers and ordering information.

In addition to the rackmount shelf, each kit contains the following parts:

- Four screws
- Four washers — nylon filler
- Four washers — nickel finish
- Four clip nuts.

Procedure 2: Passport 4400 Rack Installation

1. Install the clip nuts on the rack.

2. Place the shelf in the rack.

3. Secure both sides of the shelf to the rack, using the provided screws and washers (see Figure 2-4).

4. Position the unit on the rackmount shelf from the rear. Place the front of the unit through the cutout in the front of the rackmount shelf (see Figure 2-5).

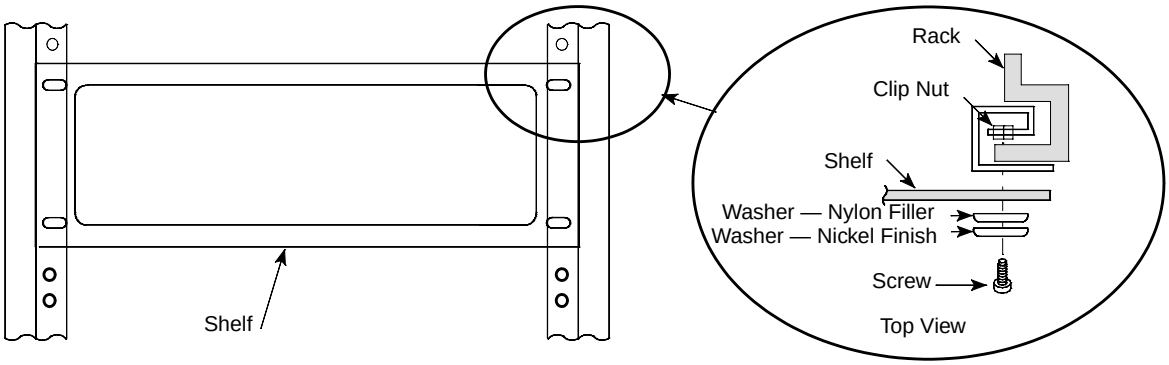


Figure 2-4. Installing the Shelf

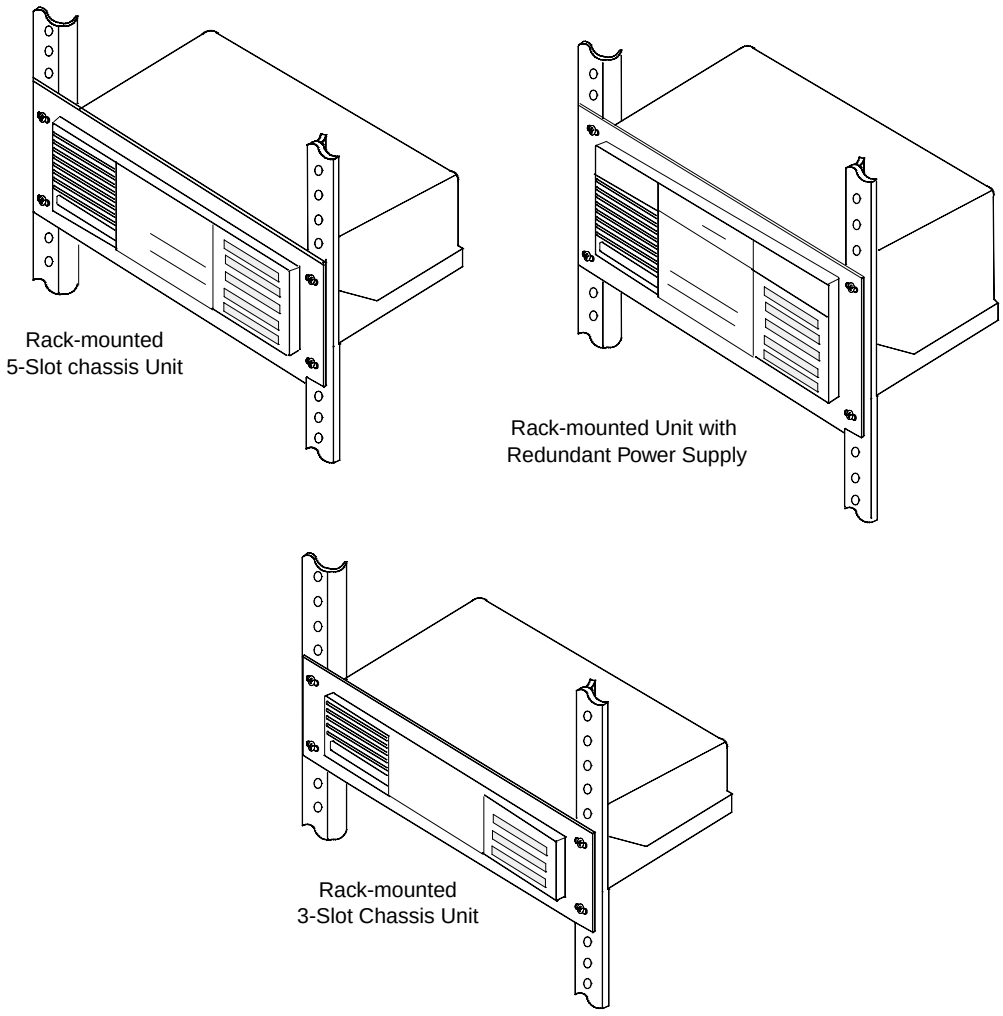


Figure 2-5. Passport 4400 in Rackmount Shelf

Powering Up an ac Unit

> ***Warning:*** Before the unit is powered up or turned on, make sure there is a separate ground wire connection between the unit chassis and input power source ground.

The power cord supplied with your unit should be one of the following:

- A molded three-prong power cord with an appropriate connector to match the power outlet in your country, as shown in the figure entitled “Power cord — Grounded.”
- A power cord with a two-prong power connector and a green-with-yellow stripe ground wire as shown in the examples in the figure entitled “Power cord — Ungrounded” on page 2-5. Since the power outlet is not grounded, contact an electrician to connect the green-with-yellow stripe wire to a fixed earth grounding point.

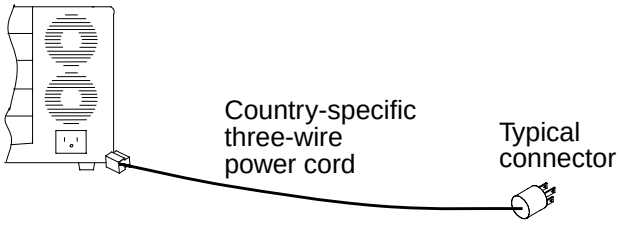


Figure 2-6. Power cord — Grounded

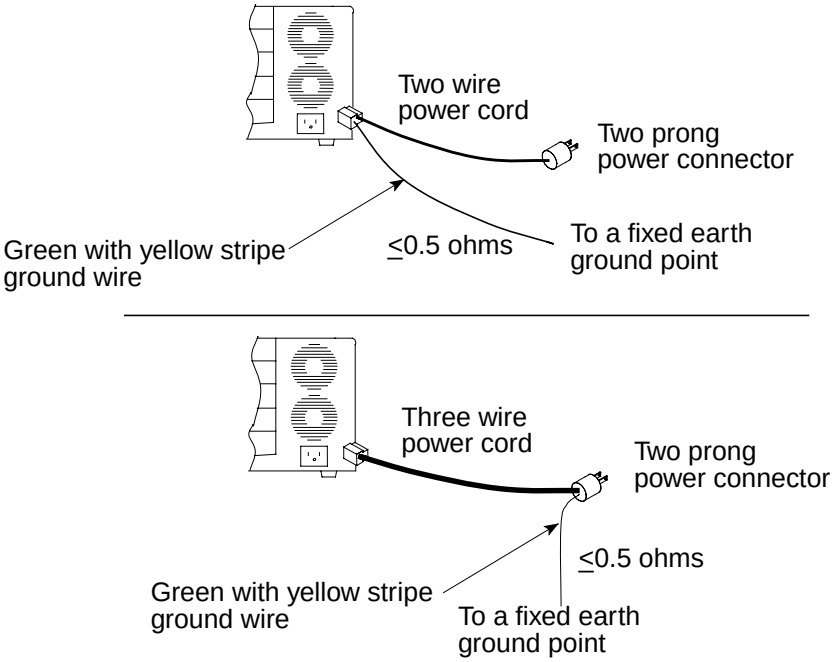


Figure 2-7. Power cord — Ungrounded

Plug the power cord supplied with your unit into the back of the chassis and into an appropriately grounded three-pin wall outlet. This turns the unit on.

Powering Up a dc Unit

> ***Warning:*** Before applying power to the Passport 4400 unit, make sure that the unit is properly grounded.

The dc version of the Passport 4400 unit has an external terminal block located on the back of the unit below the fan vents. A small black plastic door covers the terminal points. To access the terminal points, gently pull the door back from the top with your finger.

The dc power source must be connected to the unit by attaching the +48 Vdc, -48 Vdc, and the chassis ground cords to their respective terminal points located on the block as shown below.

> ***Warning:*** The connector attaching the Passport 4400 unit to the DC power source must have a single disconnect switch.

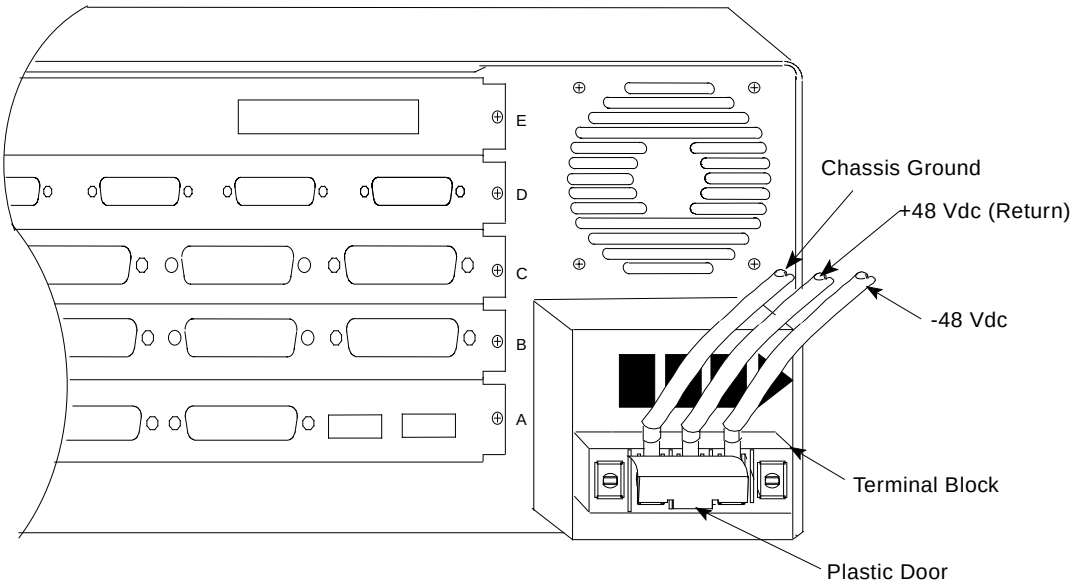


Figure 2-8. Location of dc Connection in Terminal Block

Verifying Operation

All indicators can be seen through a series of small windows at the front of the chassis (see Figure 2-9 and Table 2-2 below). The bottom window contains status indicators for the Ethernet Base Module, in addition to any serial interface modules that are installed.

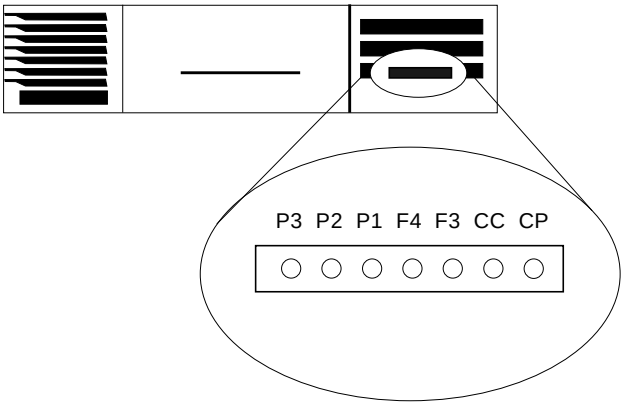


Figure 2-9. Location of Status Indicator Lights

Table 2-2. Passport 4400 Status Indicators

Indicator	Color	Meaning
CP	Green-flashing	Application is running
CC	Green	Reserved
F3	Green	Reserved
F4	Green	Reserved
P1	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved
P2	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved
P3	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved

Indicator P1 shows the status of Port 1, the Frame Relay DCE port.
Indicator P2 shows the status of Port 2, the MPANL port.
Indicator P3 shows the status of Port 3, the backup port.

Reset Switch

A reset switch is located on the base module and can be accessed from the back of the unit, as shown. Use a small, pointed object to press the switch through the hole in the back panel. The green reset indicator is also located on the base module next to the reset switch.

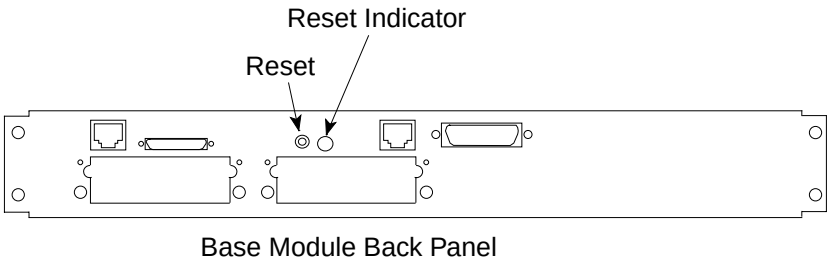


Figure 2-10. Location of Reset Switch

Three types of resets can be done by holding the switch down for different time intervals. You can tell when to release the switch by watching the flashing green indicator. The relationships are given in the table shown in Table 2-3.

Table 2-3. Using the Reset Switch

Switch interval	Indicator	Type of reset
1-5 seconds	On	Resets the CPU. Without diagnostics.
6-10 seconds	Slow flashing	Resets by reading existing configuration from flash. With diagnostics.
10+ seconds	Fast flashing	Resets by restoring all configuration parameters to their factory default values. WIth diagnostics.

Connecting the Ethernet Base Module 3

This section makes the assumption that all expansion modules have been installed and the Passport 4400 is ready to connect to the network. If you need to install expansion modules in the unit, refer to Section 6, “Installing Expansion (Data and Voice) Modules.”

If you wish to provision your 4400 for network use prior to adding cables, please refer to the 800-1952-20, *Passport 4400 Operator’s Manual*.

The Ethernet Base Module has six connectors, as follows:

- Management port
- Frame Relay DCE, Port 1
- Ethernet access port: 10BaseT
- Ethernet access port: AUI
- Port 2 (MPANL)
- Port 3 (WAN backup).

Port 2 and Port 3 are slots for plug-in modules supporting additional interfaces:

- ISDN BRI (Ports 2 and 3)
- 56kbps CSU/DSU (Port 2 only)
- T1 CSU/DSU (Port 2 only)
- Frame Relay Module (Ports 2 and 3).

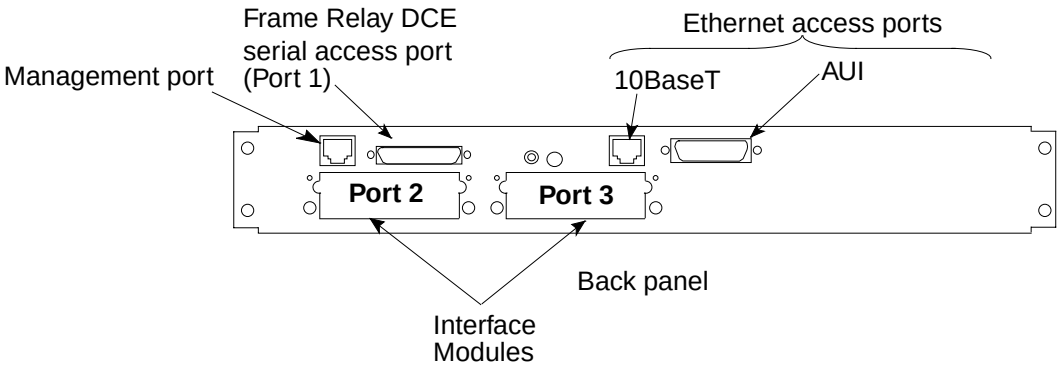


Figure 3-1. Ethernet Base Module — Rear View

Procedure 3: Attaching cables to the Ethernet base module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

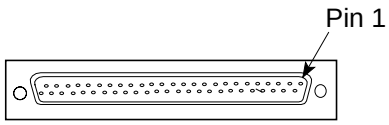
1. If required, connect the Ethernet port. Select either the RJ45 port or the RJ15 port. Do not connect both ports at the same time.
   - RJ45, 10BaseT cable to the 10BaseT port (page 3-4)
   - RJ15, AUI cable to the AUI Ethernet port (page 3-5)
2. If required, connect the management port using an RJ45 cable (page 3-4).
3. If required, connect the Frame Relay DCE port using a DB50 cable (page 3-3).
4. If required, connect the interface modules residing in Ports 2 and 3.

Additional information about cables or pin assignments can be found in Section 4, “Connecting the Expansion Modules.”

Frame Relay DCE Serial Access Port (Port 1)

- 50-pin connector
- interface determined by cable: RS-232/V.24, V.35, V.36, or X.21
- mode (DCE or DTE) determined by cable.

Notes:
- In DCE mode, the management port supplies the DTE with both transmit and receive clock.
- In DTE mode, clocking is provided externally by Passport switch for both transmit and receive. Default clocking speed in 192 kbps.



MD 50 pin assignments

1, 2	→	Interface Type Indication
3, 28	→	V.35 Transmit Data
4, 29	→	V.35 External Receive Data Clock
5, 30	→	V.35 External Transmit Data Clock
6, 31	→	V.36/X.21 Transmit Data
7, 32	→	V.36/X.21 External Receive Clock
8, 33	→	V.36 External Transmit Clock/X.21
9, 34	←	V.24/RS232/V.35/V.36 Clear to Send/ X.21
10, 35	←	V.24/RS232/V.35/V.36 Data Set Ready
11, 36	←	V.24/RS232/V.35/V.36 Carrier Detect
12	→	V.24/RS232/V.35/V.36 Ready to Send
13	←	Unassigned
14	—	Cable Present Status
15	→	V.24/RS232 External Receive Data Clock
16	→	V.24/RS232 Transmit Data
17	←	V.24/RS232 Transmit Data Clock
18	—	DTE Signal Return
19, 38, 44	—	Reserved
20, 45	←	V.35/V.36/X.21 Receive Data
21, 26	←	V.35/V.36/X.21 Transmit Data Clock
22, 47	→	V.35/V.36 Receive Data Clock/X.21 Indication
23, 24, 25	←	V.35 Input Termination Ground
26, 27, 39	—	Logic Ground
37	←	V.24/RS232/V.35/V.36 Data Terminal Ready
40	→	V.24/RS232 External Transmit Data Clock
41	←	V.24/RS232 Receive Data
42	←	V.24/RS232 Receive Data Clock
43, 48, 49	—	Logic Ground
50	—	Logic Ground

Figure 3-2. Frame Relay DCE Serial Interface/Port 1

Management Port

- supports asynchronous operation using an RS-232 physical driver
- data rate is automatically selected for speeds from 9.6 to 38.4 Kbps
- management port is RS-232/V.24 – a crossover cable is required for DTE operation.

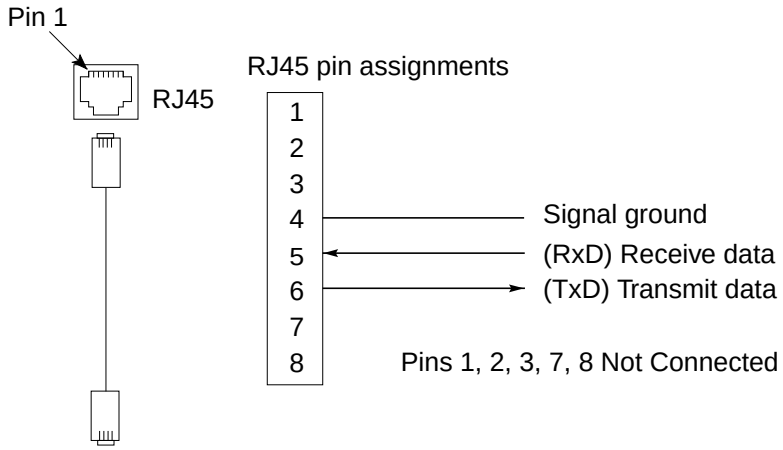


Figure 3-3. Management Port Connectors

Ethernet Access Ports

The base module has hardware for both 10BaseT and AUI ports. However, only one of these ports can be used at any one time.

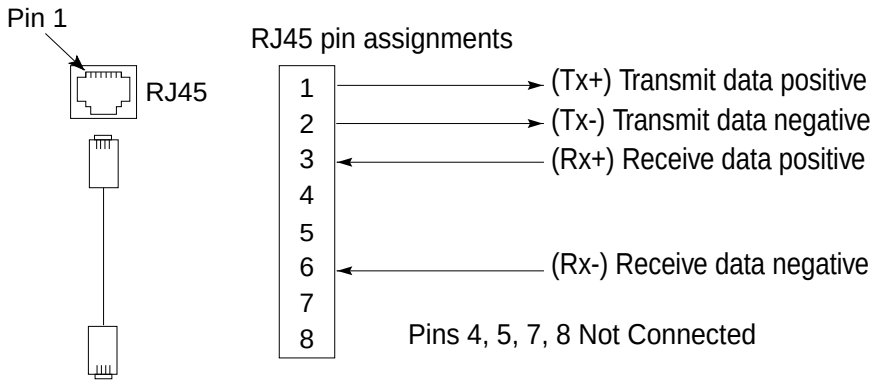


Figure 3-4. Ethernet 10BaseT Connector

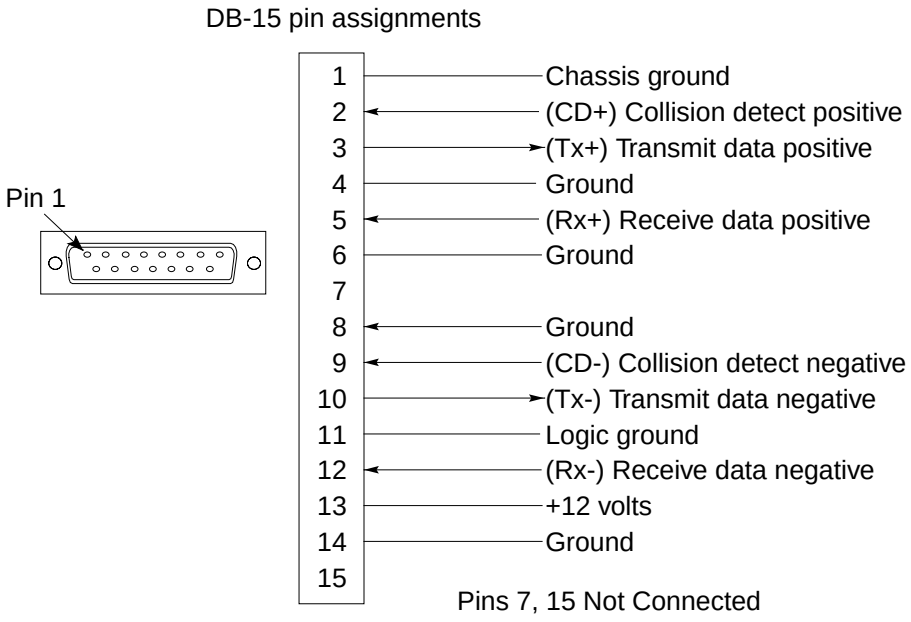


Figure 3-5. Ethernet AUI Connector

Interface Module Connectors

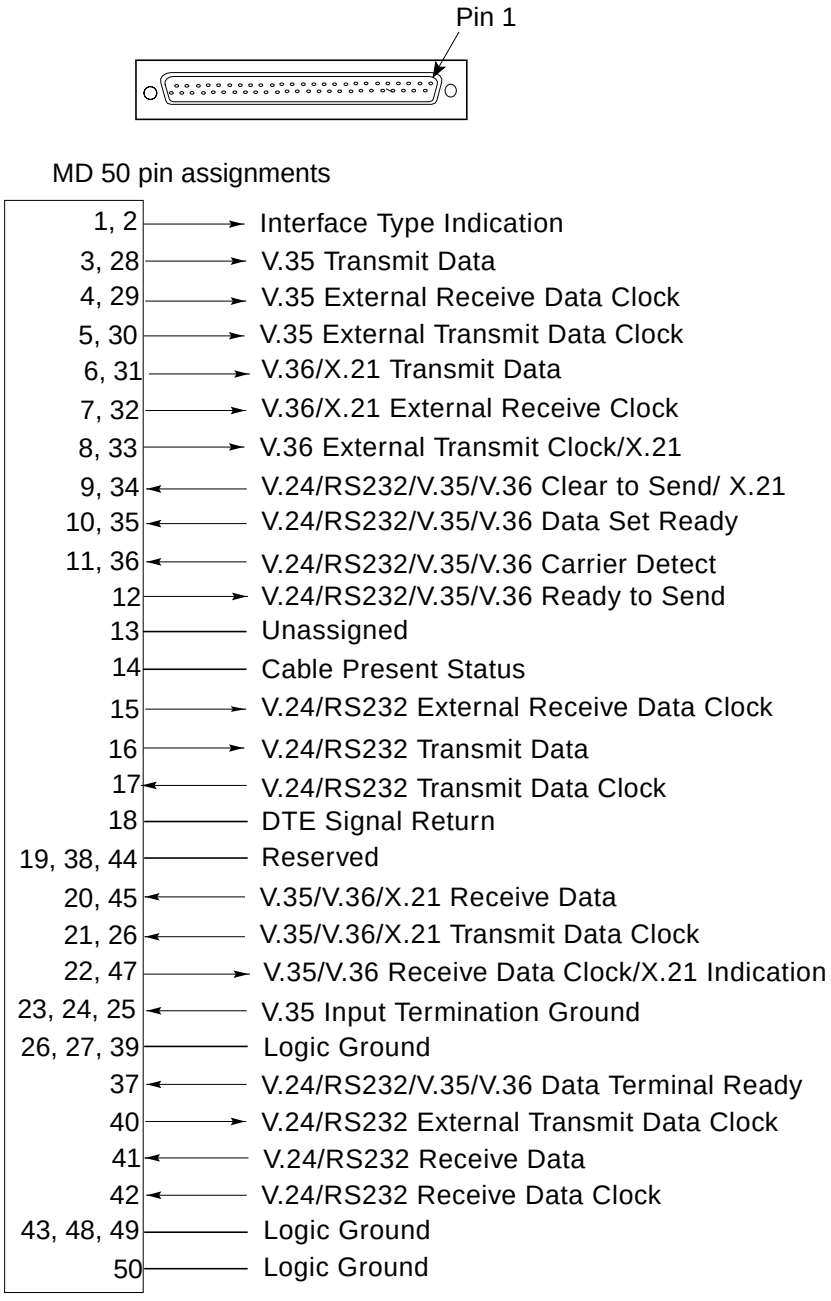

Pin 1
MD 50 pin assignments
1, 2 Interface Type Indication
3, 28 V.35 Transmit Data
4, 29 V.35 External Receive Data Clock
5, 30 V.35 External Transmit Data Clock
6, 31 V.36/X.21 Transmit Data
7, 32 V.36/X.21 External Receive Clock
8, 33 V.36 External Transmit Clock/X.21
9, 34 V.24/RS232/V.35/V.36 Clear to Send/ X.21
10, 35 V.24/RS232/V.35/V.36 Data Set Ready
11, 36 V.24/RS232/V.35/V.36 Carrier Detect
12 V.24/RS232/V.35/V.36 Ready to Send
13 Unassigned
14 Cable Present Status
15 V.24/RS232 External Receive Data Clock
16 V.24/RS232 Transmit Data
17 V.24/RS232 Transmit Data Clock
18 DTE Signal Return
19, 38, 44 Reserved
20, 45 V.35/V.36/X.21 Receive Data
21, 26 V.35/V.36/X.21 Transmit Data Clock
22, 47 V.35/V.36 Receive Data Clock/X.21 Indication
23, 24, 25 V.35 Input Termination Ground
26, 27, 39 Logic Ground
37 V.24/RS232/V.35/V.36 Data Terminal Ready
40 V.24/RS232 External Transmit Data Clock
41 V.24/RS232 Receive Data
42 V.24/RS232 Receive Data Clock
43, 48, 49 Logic Ground
50 Logic Ground

Figure 3-6. Frame Relay DCE Serial Interface Module (Port 1) Connector

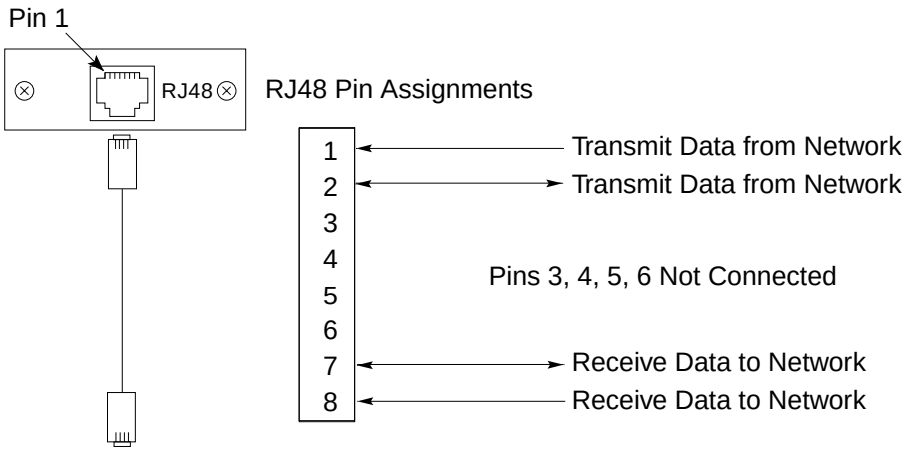


Figure 3-7. 56kbps CSU/DSU Module Connector

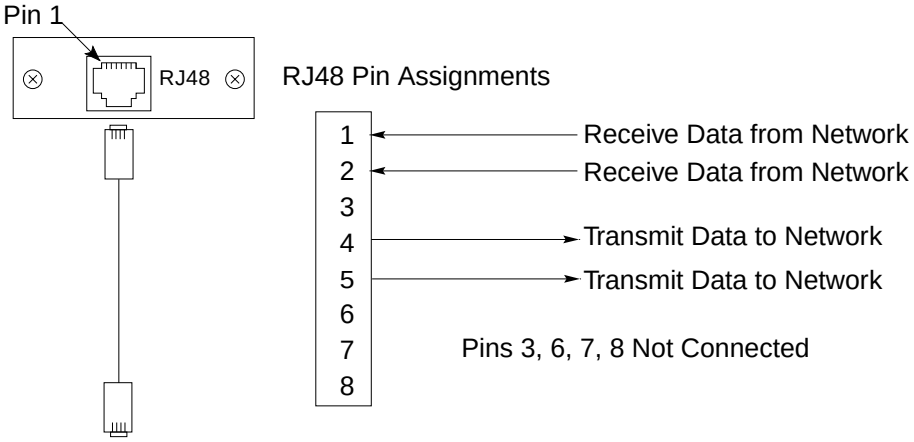


Figure 3-8. T1 CSU/DSU Module Connector

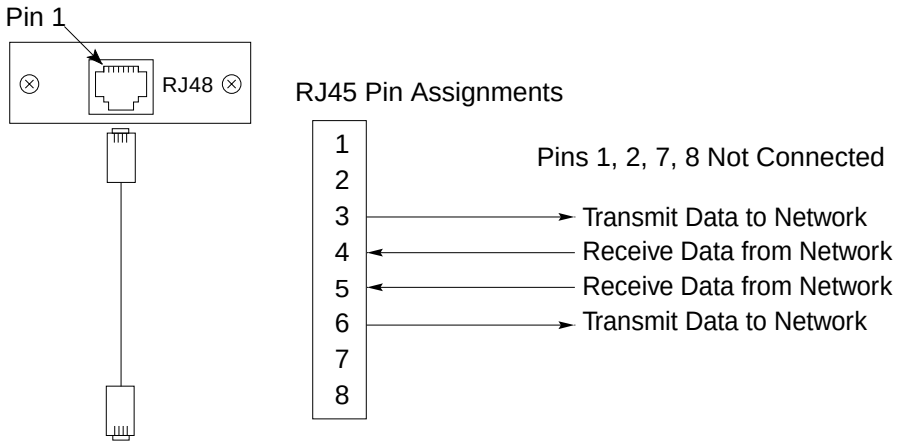


Figure 3-9. ISDN S/T Module Connector

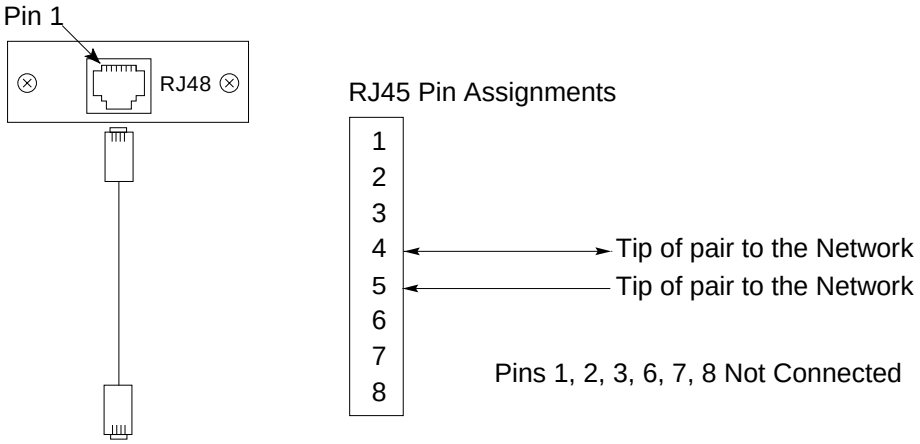


Figure 3-10. ISDN U Module Connector

Connecting the Expansion Modules 4

This section makes the assumption that all the optional modules have been installed and the unit is ready to connect to the network. If you need to install modules in the unit, refer to Section 6, “Installing Expansion (Data and Voice) Modules.”

If you wish to provision your 4400 prior to adding cables, please refer to 800-1952-20, *Passport 4400 Operator’s Manual*.

High-speed Data Module (HDM)

The High-speed Data Module provides additional ports for the Passport 4400, identical to port 1 on the Ethernet Base Module. The High-speed Data Module supports RS-232, V.35, V.36, and X.21 interfaces, as well as support for both DTE and DCE modes, as determined by the cable used.

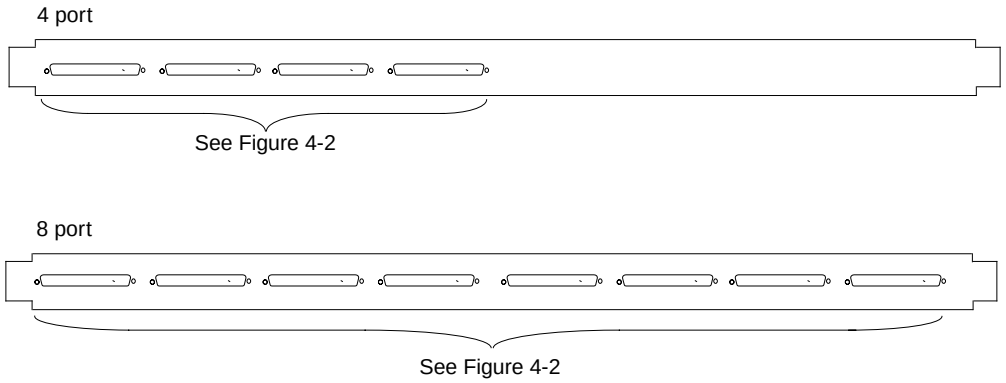


Figure 4-1. Rear View of the High-speed Data Module

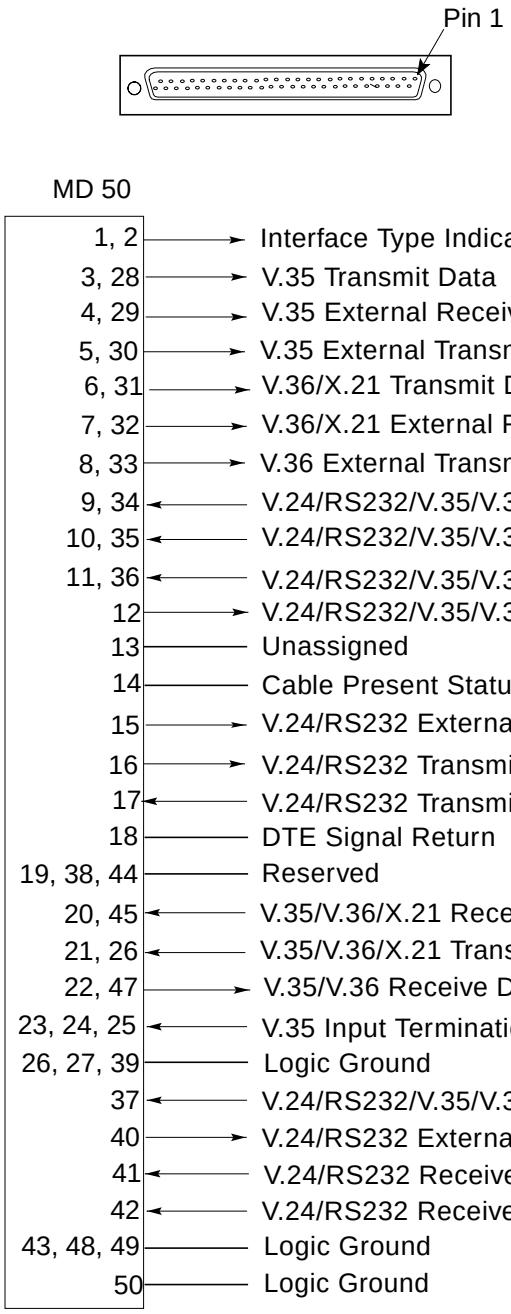

Pin 1
MD 50
1, 2 Interface Type Indication
3, 28 V.35 Transmit Data
4, 29 V.35 External Receive Data Clock
5, 30 V.35 External Transmit Data Clock
6, 31 V.36/X.21 Transmit Data
7, 32 V.36/X.21 External Receive Clock
8, 33 V.36 External Transmit Clock/X.21
9, 34 V.24/RS232/V.35/V.36 Clear to Send/ X.21
10, 35 V.24/RS232/V.35/V.36 Data Set Ready
11, 36 V.24/RS232/V.35/V.36 Carrier Detect
12 V.24/RS232/V.35/V.36 Ready to Send
13 Unassigned
14 Cable Present Status
15 V.24/RS232 External Receive Data Clock
16 V.24/RS232 Transmit Data
17 V.24/RS232 Transmit Data Clock
18 DTE Signal Return
19, 38, 44 Reserved
20, 45 V.35/V.36/X.21 Receive Data
21, 26 V.35/V.36/X.21 Transmit Data Clock
22, 47 V.35/V.36 Receive Data Clock/X.21 Indication
23, 24, 25 V.35 Input Termination Ground
26, 27, 39 Logic Ground
37 V.24/RS232/V.35/V.36 Data Terminal Ready
40 V.24/RS232 External Transmit Data Clock
41 V.24/RS232 Receive Data
42 V.24/RS232 Receive Data Clock
43, 48, 49 Logic Ground
50 Logic Ground

Figure 4-2. Pin Assignments for all Data Modules

Procedure 4: Attaching cables to the High-speed Data Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

1. As required, use a DB50 cable to connect each MD50 port to your local equipment.

For further information about cables and pin assignments, see Appendix A, "Cable Diagram Pin Assignments."

Legacy Data Module (LDM) and Legacy Data Expansion Module (LEM)

The Legacy Data Module (LDM) provides interface ports to support legacy data protocols in Passport 4400. Additional interface ports are supported through the use of the Legacy Data Expansion Module (LEM).

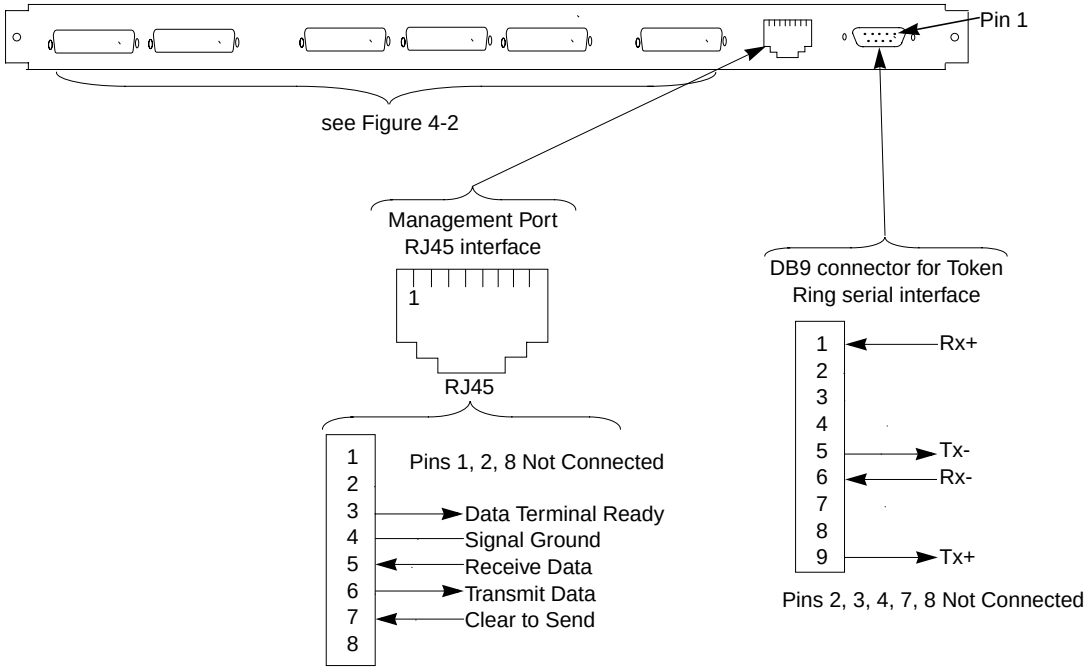


Figure 4-3. Rear View of the Legacy Data Module

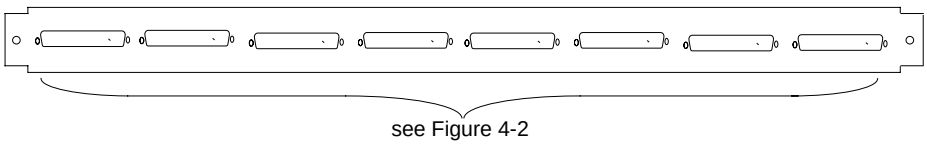


Figure 4-4. Rear View of the Legacy Data Expansion Module

Procedure 5: Connecting the Legacy Data Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

1. If required, use a DB50 cable to connect each MD50 port to your local equipment.
2. If required, connect the management port using an RJ45 cable.
3. If requires, connect the token ring serial interface using a DB9 cable.

Procedure 6: Connecting the Legacy Data Expansion Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

1. If required, use a DB50 cable to connect each MD50 port to your local equipment.

For further information about cables and pin assignments, see Appendix A, "Cable Diagram Pin Assignments."

T1 Voice Module (TVM)

Note: Before you can connect this module, the T1 Voice Module location switch must be set for slot B. If your Passport 4400 unit has been factory assembled, the switch has already been set for slot B. Refer to section 6, “Installing Expansion (Data and Voice) Modules,” for further information.

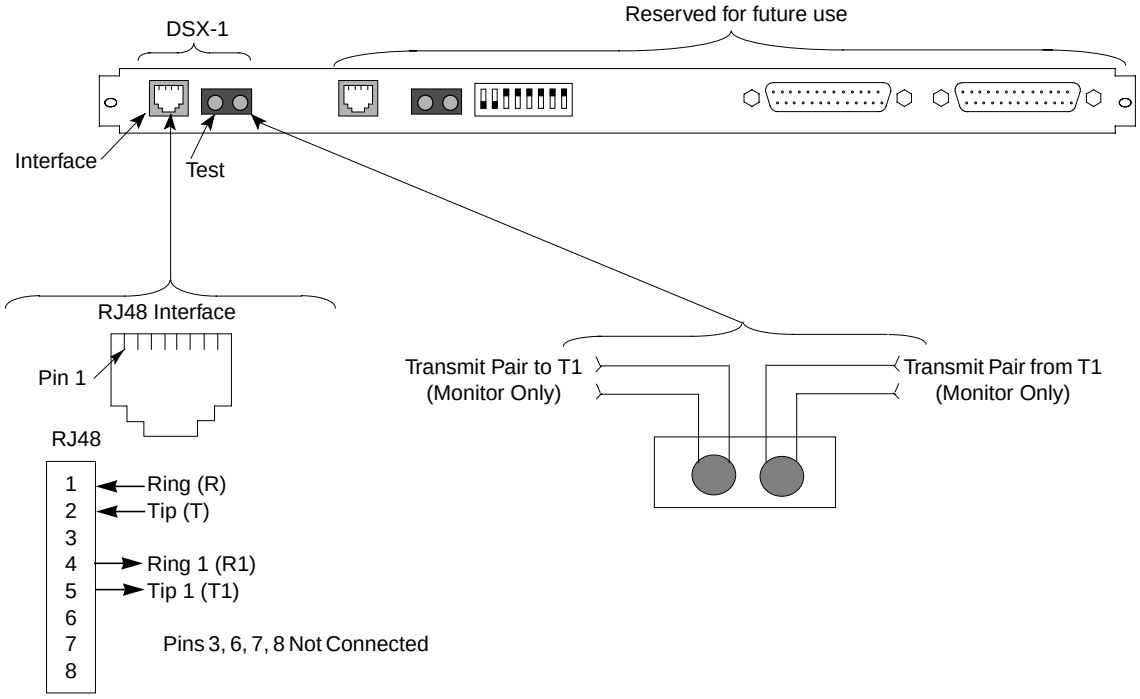


Figure 4-5. Rear View of the T1 Voice Module

Procedure 7: Attaching cables to the T1 Voice Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

1. Use an RJ48C cable (typically a modular crossover cable) to connect the DSX-1 port to your local equipment, typically a digital PBX.

For further information about cables and pin assignments, or if you need to construct special cables to match specific T1 requirements for your site, see Appendix A, “Cable Diagram Pin Assignments.”

E1 Voice Module (EVM)

Note: Before you can connect this module, the E1 Voice Module location switch must be set for slot B. If your Passport 4400 unit has been factory assembled, the switch has already been set for slot B. Refer to section 6, “Installing Expansion (Data and Voice) Modules,” for further information.

This module can be connected with either a 75 Ω termination or a 120 Ω termination. These terminations are determined by jumper settings on the module board. If you are unsure how these jumpers are set or if you want to change the settings on the unit you have received, see section 9 before connecting this module.

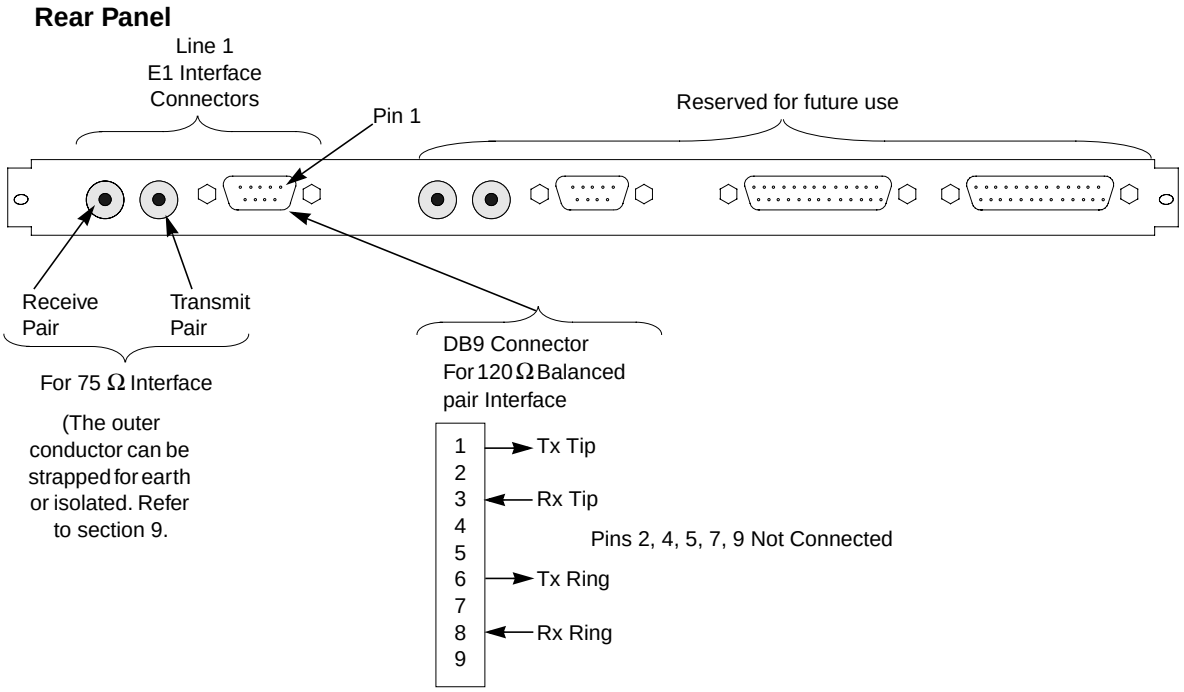


Figure 4-6. Rear View of the E1 Voice Module

Procedure 8: Attaching cables to the E1 Voice Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit, consult your system administrator.

1. Use either the DB9 connector (120 Ω) or the two BNC connectors (75 Ω, one for transmit and one for receive), as applicable, to connect Line 1 to your interfacing equipment.

For further information about cables and pin assignments, see Appendix A, “Cable Diagram Pin Assignments.”

Analog Voice Module (AVM)

Prior to connecting the Analog Voice Module (AVM), ensure that the interface type/signaling convention has been properly strapped (refer to Section 8, "Analog Voice Modules"). The connection procedure is identical for modules with either single or dual channels, although modules with the dual channel feature may be configured for two different types of signaling conventions.

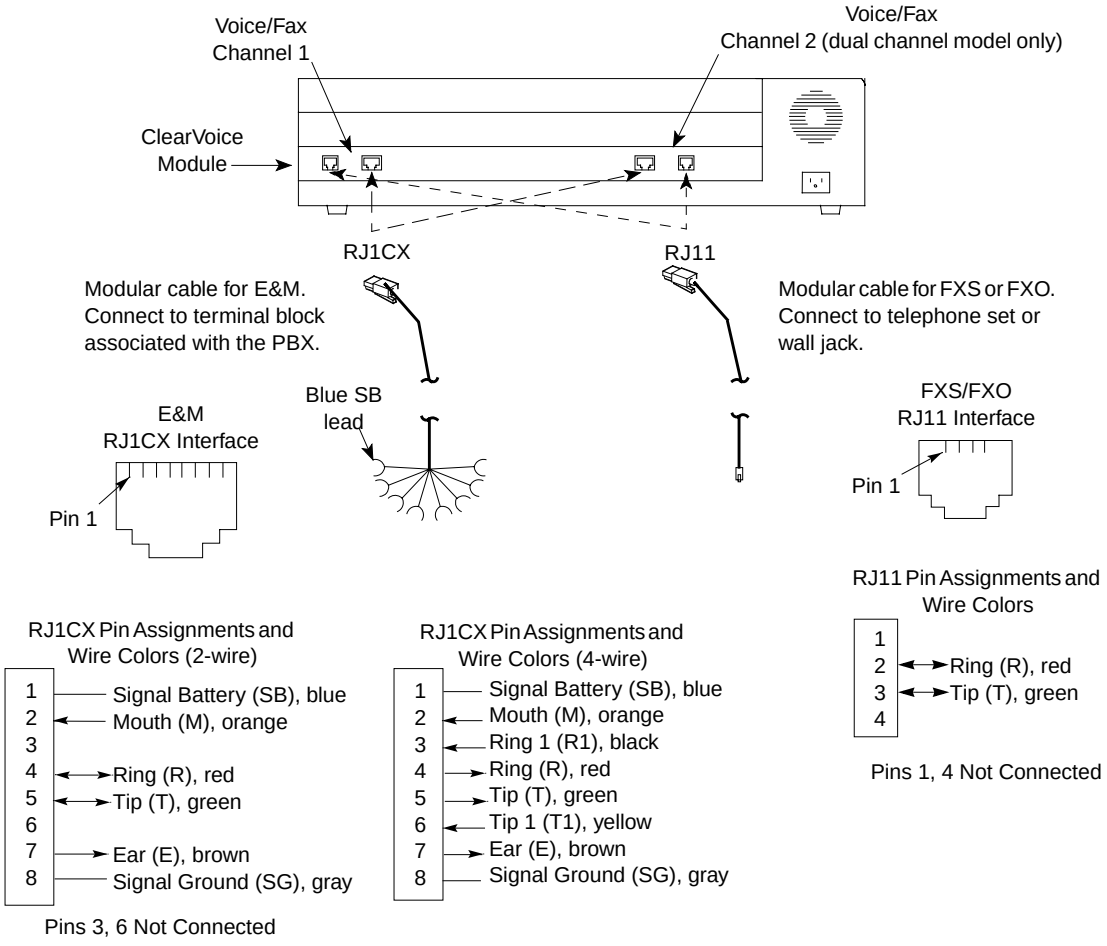


Figure 4-7. Rear View of the Analog Voice Module (Dual Channel)

Procedure 9: Attaching cables to the Analog Voice Module

Note: The connections made in this procedure will depend on the specific site requirements. If you are not sure of the exact connections required for the Passport 4400 unit you are installing, consult your system administrator.

1. If your site requires an E&M connection for channel 1, use a modular RJ-1CX cable to connect the Passport 4400 unit to a PBX. The pin assignments for both 2-wire and 4-wire cables are shown in Figure 4-7.
2. If your site requires an FXS or FXO connection for channel 1, use a modular RJ11 cable to connect the Passport 4400 unit to a telephone set or wall jack.
3. Connect Channel 2 (dual channel model only) using either step 1 or step 2, depending on the requirements of the specific site.

For further information about cables and pin assignments, see Appendix A, "Cable Diagram Pin Assignments."

Universal Analog Voice Module (UAVM)

The Universal Analog Voice Module (UAVM) consists of two channels into which one of the three voice interface modules for E&M, FXO, or FXS is inserted. The UAVM board must be configured with the correct jumper settings for the types of interface modules you plan to use before you can connect the modules to the network. Voice interface modules can be connected with either RJ11 modular cables or with a direct connection to a terminal block.

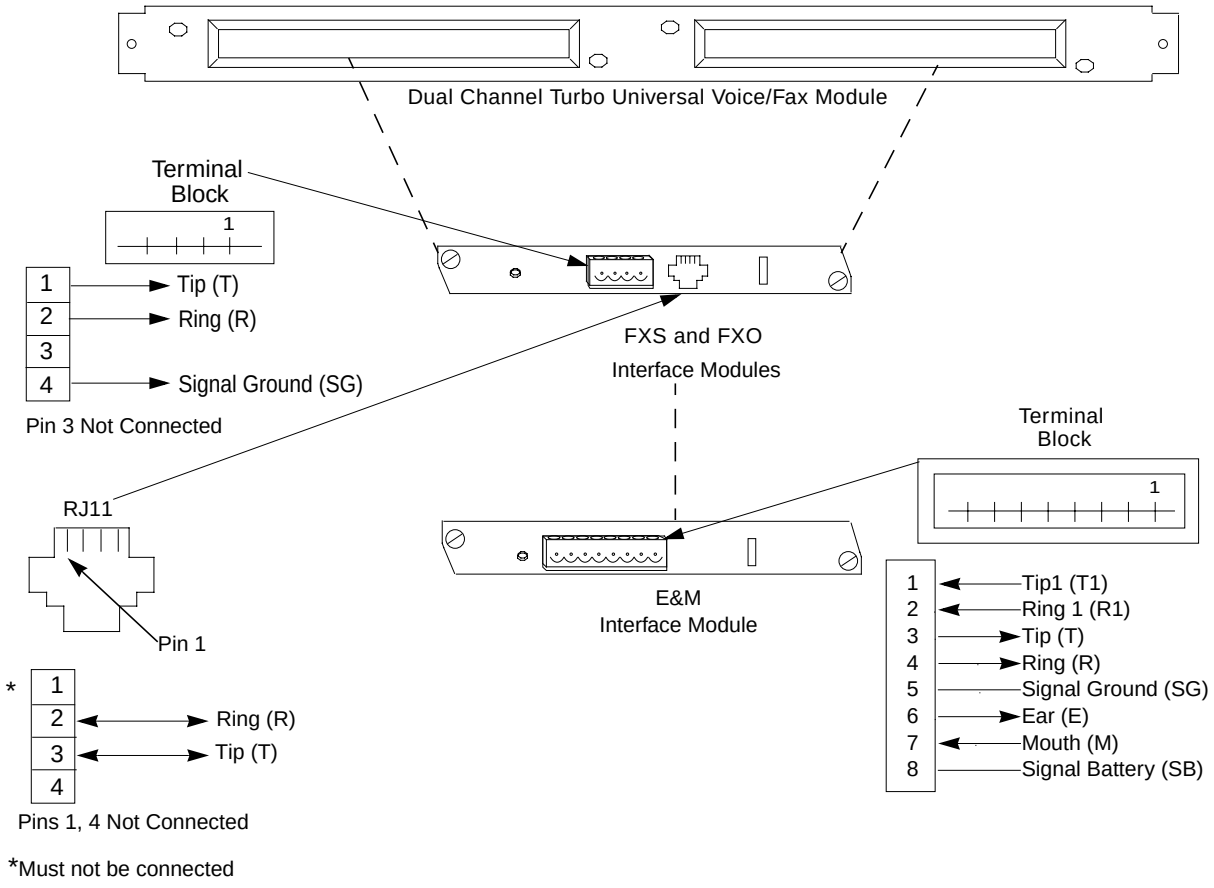


Figure 4-8. Universal Analog Voice Module with FXS, FXO, and E&M Voice Interface Modules

Use of Terminal Block

> ⚠ ***Caution:*** Wiring to the tie trunk terminal block should be carried out by a qualified technician. Wires used for this purpose must be UL type CM, 22/24 AWG, 8-conductor.

On FXS and FXO interface modules, the 4-pin terminal block is an alternate method of connection to the telephone interface equipment. The FXS and FXO interface modules provide a direct connection to the common signal ground (SG) of the line power.

On E&M interface modules, the 8-pin terminal block is the only method of connection to the telephone interface equipment; there is no modular jack.

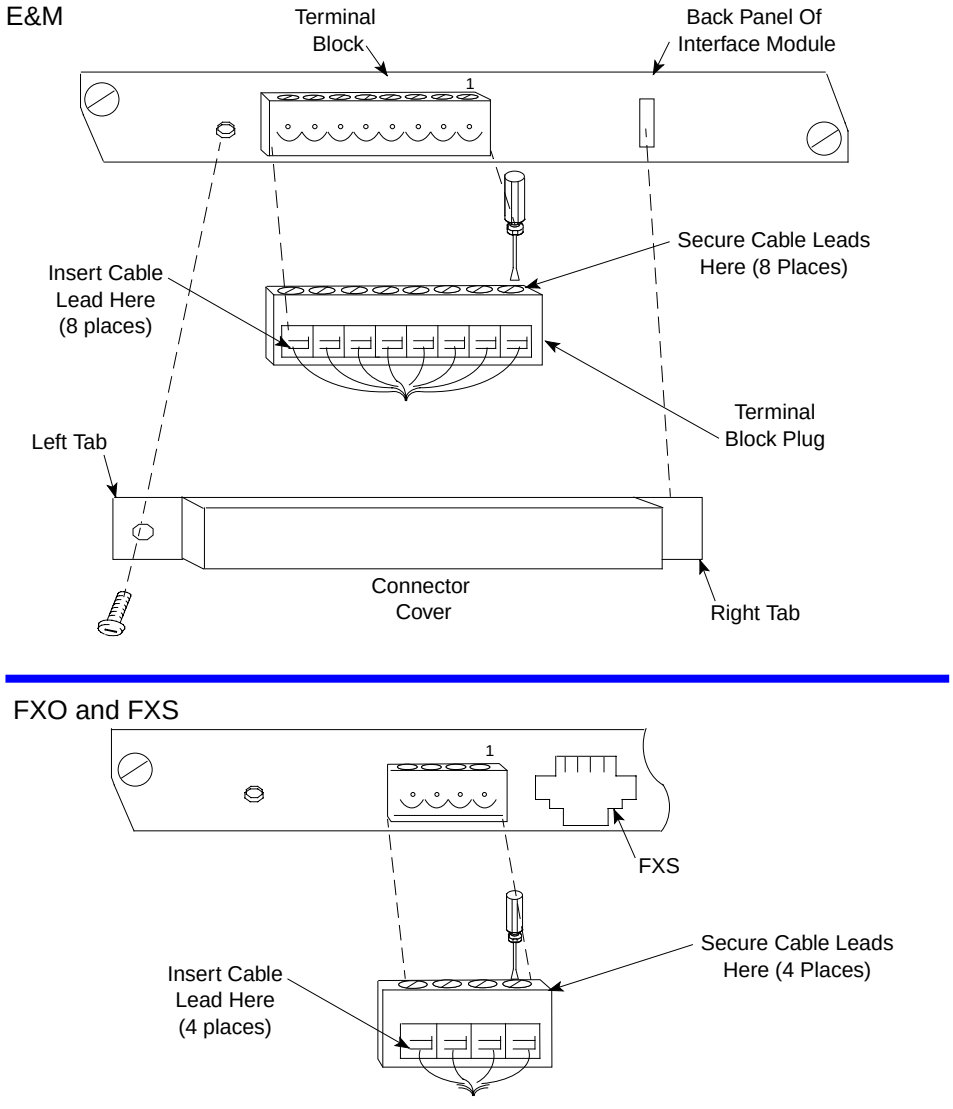


Figure 4-9. Terminal Block Cable Connections

Procedure 10: Terminal block connection

1. Remove the plug from the terminal block.
2. Use a cable (not supplied) with bare-wire leads. Insert each cable lead into the cutout at the front of the plug and secure it with a small flathead screwdriver at the top. It is recommended that the cable leads be color coded for easy identification.
3. Insert the plug that now includes the cable leads in the terminal block.
4. After the connection is made, install the connector cover by inserting the right tab of the cover in the retaining slot of the interface module back panel. Secure on the left side with a Phillips-head screw.

For further information about cables and pin assignments, see Appendix A, "Cable Diagram Pin Assignments."

Ethernet Base Module and Interface Modules 5

The Ethernet Base Module performs central processing functions for the 4400. It must be present in the lowest slot (LIM A) for the unit to function. This module includes the following:

- processor and memory
- serial access port
- managment port
- ethernet interfaces (AUI or 10BaseT)
- optional plug-in interface modules.

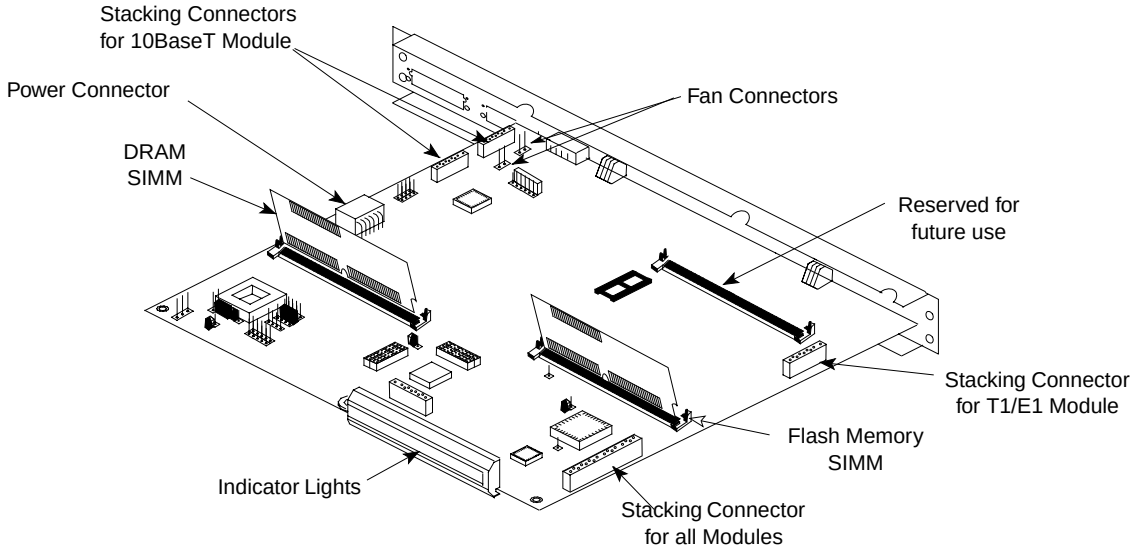


Figure 5-1. Components of the Ethernet Base Module

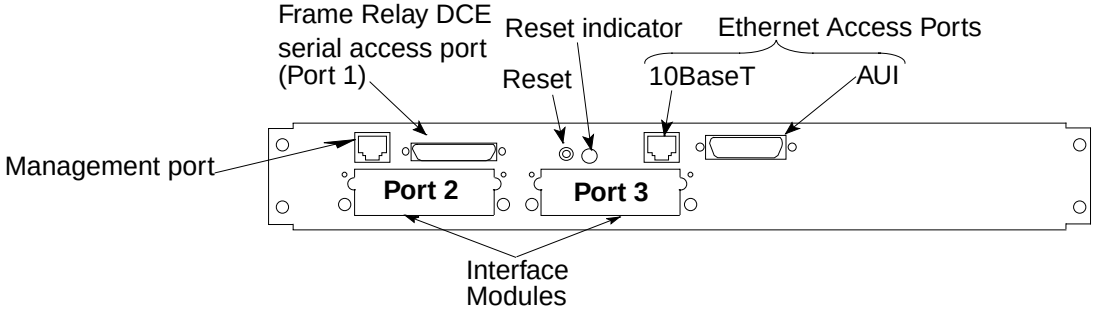


Figure 5-2. Ethernet Base Module — Rear View

The Ethernet Base Module comes installed in your 4400 Should you need to remove it, remove all modules above it (refer to Section 6, "Installing Expansion (Data and Voice) Modules" for information on opening the unit), disconnect the power connector, remove the 4 screws in the back panel and lift the board out.

Interface Modules

The Ethernet Base Module currently supports the following interface modules: WAN serial interface module, 56kbps CSU/DSU interface module, T1 CSU/DSU interface module, and ISDN interface module.

> ⚠ ***Caution:*** The interface module must not be inserted into or removed from the unit while the unit is operating. This could cause damage to the unit and/or interruption of network service.

Procedure 11: Installing an interface module

1. Slide the interface module gently into the slot labeled Port 2 or Port 3 on the lower left end of the Ethernet base module back panel. Make sure the component side of the module is down.
2. Ensure that the module is pushed all the way in so it mates with the connector at the back of the slot.
3. Secure the module with the two Phillips screws supplied with the module.

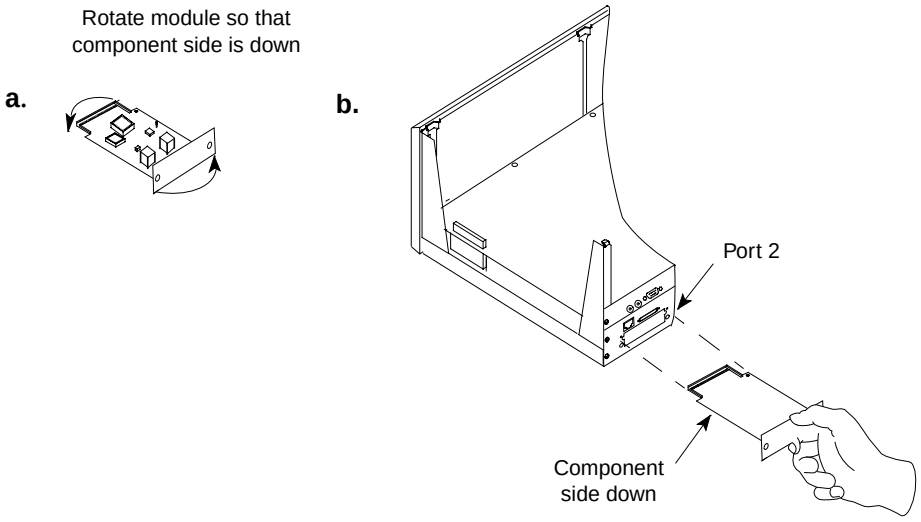
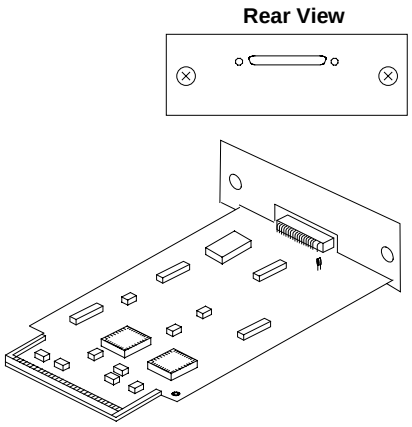


Figure 5-3. Installing an Interface Module

WAN Serial Interface Module

The WAN serial interface module provides additional port capability, identical to port 1 on the base module. The module supports RS-232, V.35, V.36, and X.21 interfaces, determined by the cable used. The module can support both DTE and DCE modes. Both Port 2 (MPANL port) and Port 3 (WAN Backup port) can support the WAN serial interface module.



Note: The interface module must be inserted into the unit with the component side facing down.

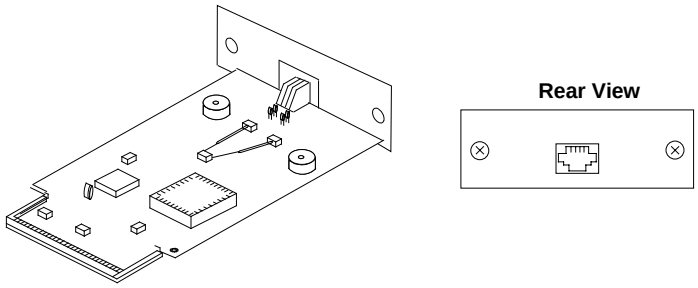
Figure 5-4. Front and Back View of the WAN Serial Interface Module

56kbps CSU/DSU Interface Module

The 56kbps module supports the Dataphone Digital Service (DDS) without the secondary signaling channel. This interface module supports the following loopback modes:

- DSU loopback
- CSU loopback
- digital loopback
- local loopback
- local loopback transmit end (LLT)
- local loopback receive end (LLR).

The 56kbps CSU/DSU interface module may only be used in the Port 2 (MPANL port) slot. Do not place the 56kbps module in Port 3.



Note: The interface module must be inserted into the unit with the component side facing down.

Figure 5-5. Front and Back View of 56kbps CSU/DSU Interface Module

An 8-position RJ48C jack is provided to interface with the DDS network.

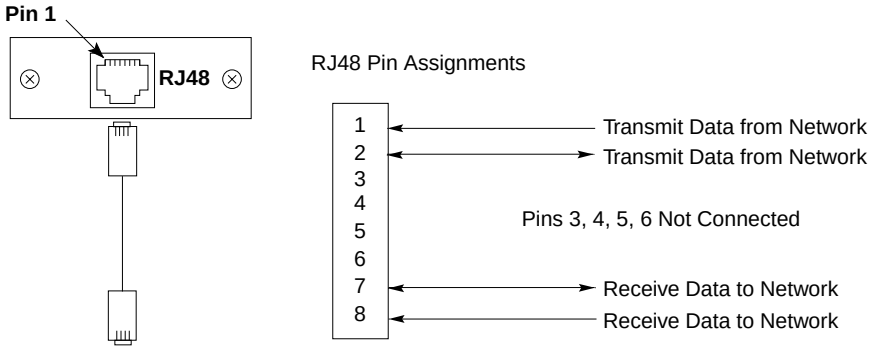


Figure 5-6. 56kbps CSU/DSU Connector

T1 CSU/DSU Interface Module

The T1 CSU/DSU interface module provides a direct T1 or fractional T1 connection to Passport T1 FP or any other compatible device. The T1 connection provides a larger communication bandwidth than the serial connection.

The T1 CSU/DSU module may only be used in the Port 2 (MPANL port) slot. Do not place this module in Port 3.

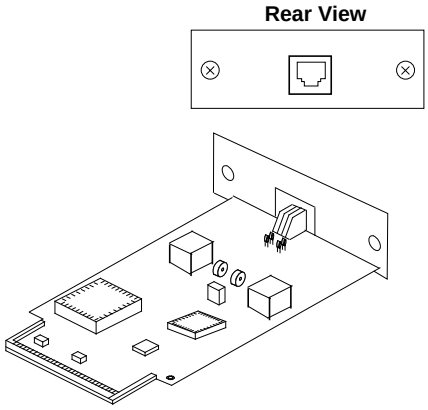


Figure 5-7. Front and Back View of T1 CSU/DSU Interface Module

Note: A T1 Access Voice module interface is also available for use in Passport 4400 units. Refer to chapter 9 of this manual for information about the T1 Access Voice module.

An 8-pin RJ48C jack is provided to interface with the T1 network.

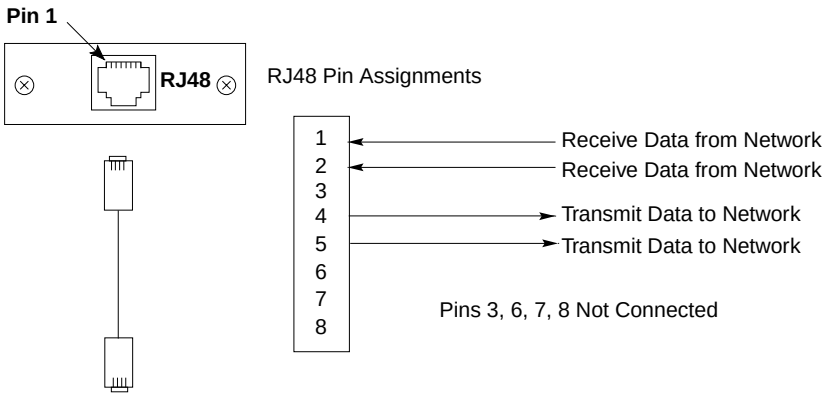


Figure 5-8. T1 CSU/DSU Connector

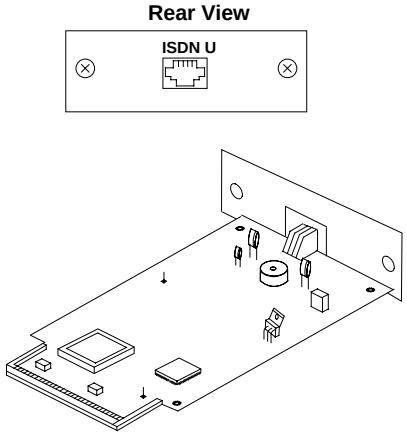
ISDN Interface Module

The ISDN (integrated services digital network) basic rate interface (BRI) plug-in module will be used as a primary network link connection to the WAN or for backup in case of failure. ISDN interface modules may be placed in both Port 2 (MPANL port) and Port 3 (WAN backup port).

There are two types of ISDN interface module, one supporting an ISDN S/T interface, and the other supporting an ISDN U interface. Both are accessed via an RJ-45 connector.

The data frame of the ISDN interface consists of three data channels (D, B1, and B2). The D-channel is used to exchange control information between the user and the network, as well as transferring data, at a data rate of 16 kbps. Channels B1 and B2 are used to transfer data at the rate of 64 kbps.

ISDN U Interface Module



Note: The interface module must be inserted into the unit with the component side facing down.

Figure 5-9. Front and Back View of ISDN U Interface Module

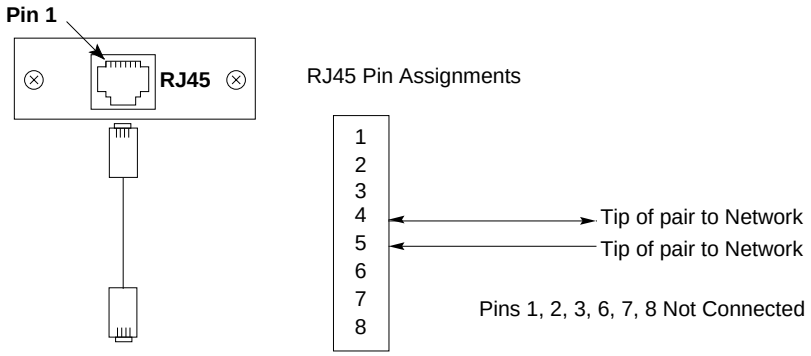
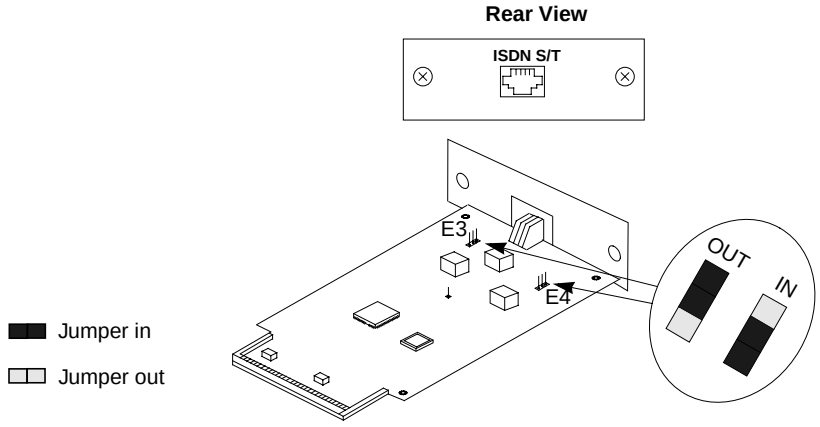


Figure 5-10. ISDN U Interface Module Connector

ISDN S/T Interface Module

There are two user-adjustable straps on the ISDN S/T interface module, E3 and E4. These straps are used to configure the ISDN connection. Both straps are set to the factory default of OUT.

- Setting strap E3 to IN adds a 100 ohm terminating resistor to the receiving channel.
- Setting strap E4 to IN adds a 100 ohm terminating resistor to the transmitting channel.



Note: The interface module must be inserted into the unit with the component side facing down.

Figure 5-11. Front and Back View of ISDN S/T Interface Module

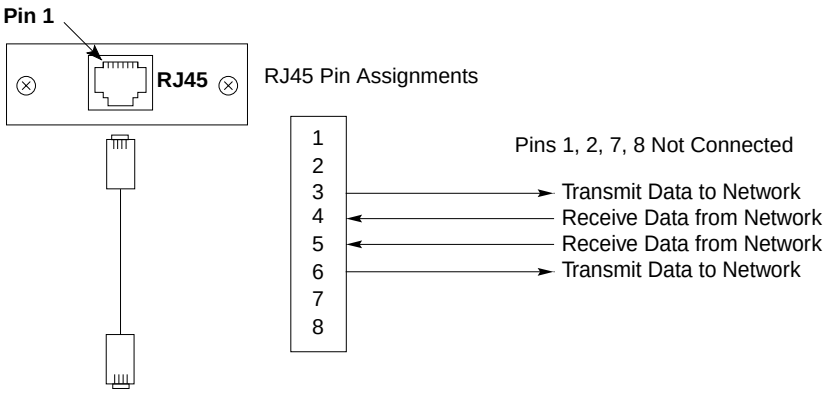


Figure 5-12. ISDN S/T Interface Module Connector

Installing Expansion (Data and Voice) Modules 6

This section contains general installation information for all optional expansion modules for Passport 4400 units. For information on installing interface modules refer to the following sections:

- Section 5, “Ethernet Base Module and Interface Modules”
- Section 8, “Analog Voice Modules.”

Safety Information

Before performing any of the procedures included in this section, see the information in “Safety Information” on page 1-4.

> ***Caution:*** Modules cannot be inserted into or removed from the unit while the Passport 4400 unit is operating. This could cause damage to the unit or interruption of network service or both.

> ***Caution:*** Do not connect external cables until module installation is complete.

> ***Warning:*** When working inside the unit, be sure to take all precautions against electrostatic discharge.

Notice of Electromagnetic Compatibility (EMC)

The following label certifies that, when installed in an approved chassis, the voice/fax module meets EMC Level A of the EN55022 Standard. This label is also affixed to the voice/fax module.

> ***Warning:*** This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

In addition to the EMC Standard, this module meets and complies with the EU 50082 Immunity Standard.

Module Stacking Order

Before placing any expansion modules into the Passport 4400, the stacking order must be determined. Table 6-1 shows the proper stacking order for each expansion module.

Using the table, determine the stacking order for your Passport 4400 expansion modules. For instance, a Passport 4400 unit with a T1 Voice Module (TVM), an Analog Voice Module (AVM), and a High-Speed Data Module (HDM) would have the HDM in the bottom slot, followed by the TVM and the AVM.

Note: Modules must be stacked from bottom to top, without skipping a slot.

Table 6-1. Module Stacking Order

Top

Bottom

Module	Max No. in unit	LIM Type
Analog Voice Module (AVM)	4	Alphabetical: LIM B (lowest) through LIM E (highest)
Universal Analog Voice Module (UAVM)	4	
Digital Voice Expansion Module (DVEM)	2	
T1 Voice Module or E1 Voice Module (TVM/EVM)	1	
Legacy Data Expansion Module (LEM)	2	Numeric: LIM 1 (lowest) through LIM 4 (highest)
Legacy Data Module (LDM)	1	
High-speed Data Module (HDM)	2	
Ethernet Base Module (EBM)	1	Always LIM A

Determining the Logical Interface Module (LIM) Identifier

Once the stacking order is determined, each expansion module must be assigned to a Logical Interface Module (LIM). The Passport 4400 uses the LIM identifier to keep track of the position of each module within the unit. The LIM identifier is set using a four-position switchbank located on the module.

Modules with numeric switches (data modules) are assigned LIMs starting at 1 and continuing up to 4. Modules with alpha switches (voice modules) are assigned LIMs starting at B and continuing up to E (LIM A is already assigned to the Ethernet Base Module). Typical stacking orders for a 5-slot Passport 4400 might look like (from bottom to top) 1-2-B-C, 1-B-C-D, 1-2-3-B, or B-C-D-E.

Setting the Switchbank

To set a switch to on, use a ballpoint pen or similar pointed tool and push the switch down. Take care that only one switch is *on* (down) and that the remaining three switches are *off* (up). See Figure 6-1, "Dip Switch Locations."

Notice that each switch can represent either a numeric LIM or an alpha LIM, depending on the expansion module. For instance, setting the leftmost switch to *on* would assign LIM 1 to a data module; the same switch settings on a voice module would assign LIM B.

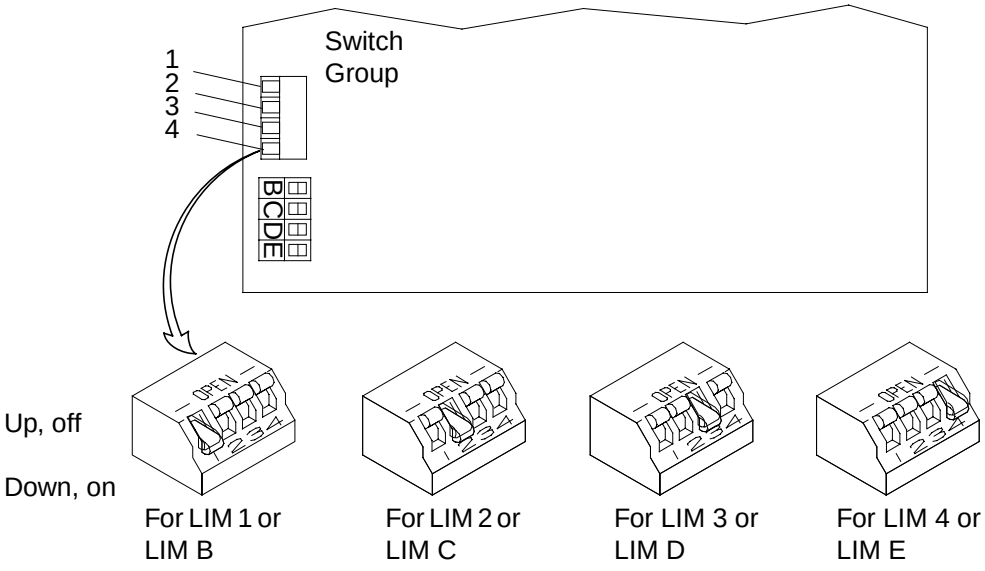


Figure 6-1. Dip Switch Locations

Stacking Connectors

Stacking connectors act as a bus allowing data to be transferred between the expansion modules and the base card; they must be firmly seated within their mating connectors.

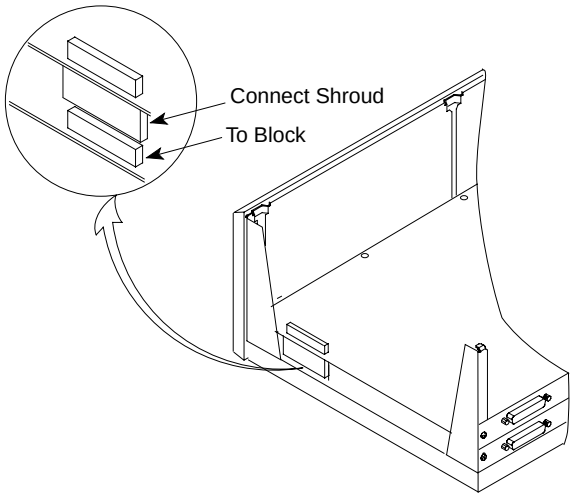


Figure 6-2. Stacking Connector

Back Panel Grounding Clips

To ensure that the modules meet regulatory agency requirements, the grounding clips must not removed from the back panel.

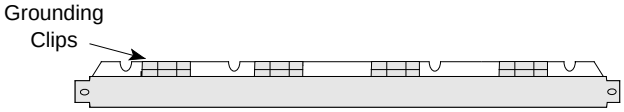


Figure 6-3. Grounding Clips

Spacers

Spacers are attached to the inside of the front of the 4400. They are used to secure the expansion modules inside the unit.

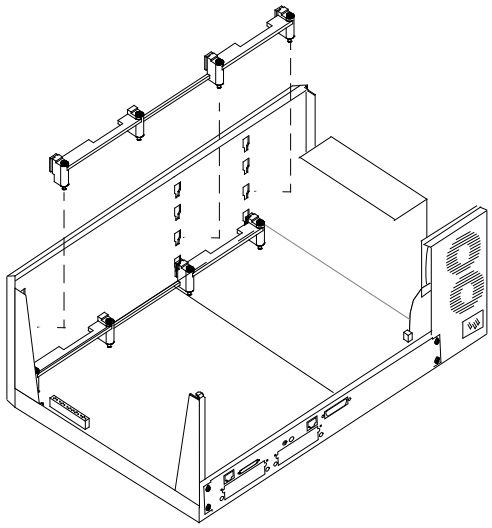


Figure 6-4. Spacers

Blank Back Panels

Any open space not occupied by a module must contain a blank back panel. Blank back panels ensure proper air flow over installed module, keep excessive dirt and contamination out of the unit, and ensure compliance with radiated emissions standards. Remove the blank back panels to accommodate new modules, and reinstall a blank back panel if a module is removed.

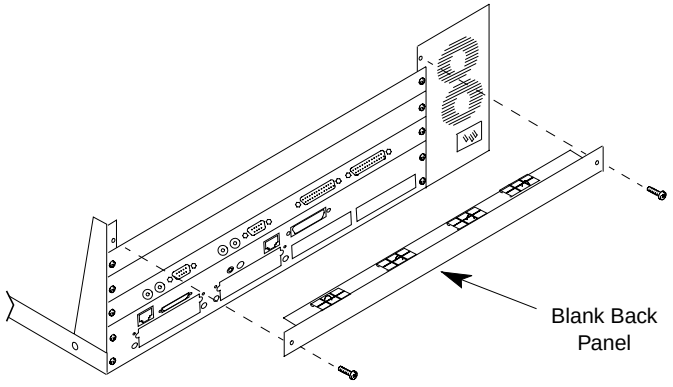


Figure 6-5. Installation or Removal of Blank Back Panels

Installing an Expansion Module

Modules should be set for the appropriate application when they arrive from the factory. If changes need to be made to the module, such as setting jumpers or switches, refer to the section that specifically covers the module. To install an expansion module, us the following procedures.

> ⚠ ***Caution:*** Modules cannot be inserted into or removed from the unit while the Passport 4400 unit is operating. This could cause damage to the unit or interruption of network service or both.

> ⚠ ***Caution:*** When working inside the unit, be sure to take all precautions against electrostatic discharge.

Note: Make sure that you have adequate clearance, at least 6 inches (15 cm) above the cover and on the sides of the unit, to accommodate the use of a screwdriver.

To complete these procedures you will need a Phillips screwdriver, size 1 or 2.

Procedure 12:

Installing an expansion module

1. Remove the power from the unit by unplugging the cord from the wall socket.

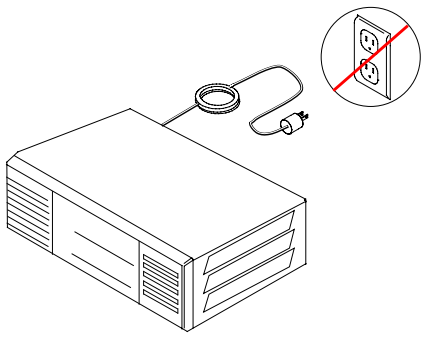


Figure 6-6. Cord Unplugged from Wall Socket

2. Unscrew the four screws (two on each side of the cover). Save the screws.
3. Push the cover toward the back of the unit until the front flanges are uncoupled.
4. Lift off the cover.
5. Remove blank back panels as required.

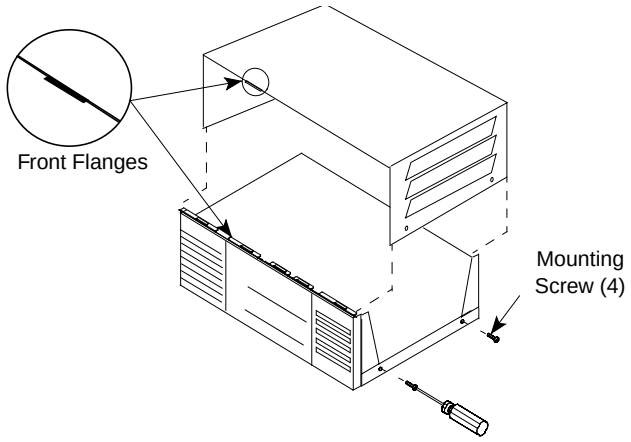


Figure 6-7. Location of Front Flanges and Mounting Screws

6. Refer to Section 10, “Power Supplies,” to verify that the correct number of power supplies are configured for the number of modules used in the unit.
7. Strap the module, (refer to the section for the individual module).
    - Section 7, “Data Modules”
    - Section 8, “Analog Voice Modules”
    - Section 9, “T1/E1 and Digital Voice Modules.”
8. Set the module switch set using the instructions in “Module Stacking Order” on page 6-2.
9. Place a spacer between the previous module and the module to be installed.
10. Place the module on the spacer in front and on the previous module’s back panel in the back. The back panel goes on the outside of the chassis.
11. Connect the stacking connector. Press down so that they mate completely.
12. Align the two holes on the module back with the two holes on the back of the chassis. Using screws, join the back panel to the chassis.
13. Continue to stack modules using steps 7-12 until all modules have been installed.
14. Ensure that any blank module locations contain blank back panels.
15. Close the unit by replacing the cover.

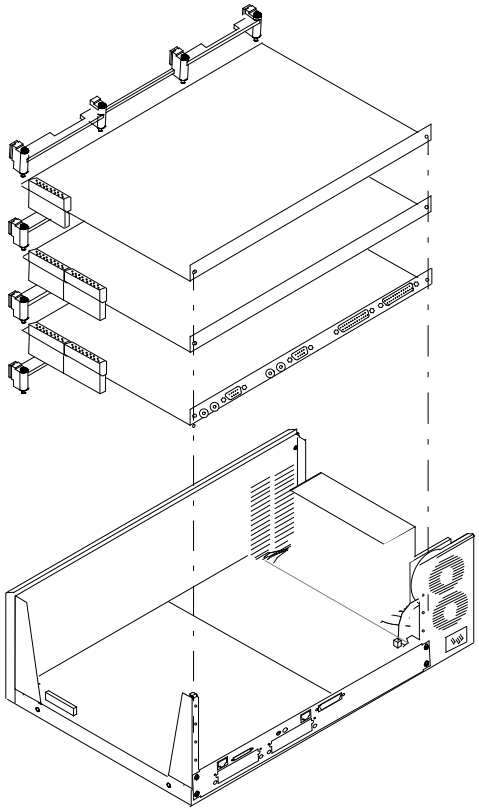


Figure 6-8. Installing Expansion Modules in the Passport 4400 Chassis

Data Modules 7

High-speed Data Module

There are two versions of the High-speed Data Module (HDM), one with four ports and one with eight ports. The High-speed Data Module provides additional port capability, identical to port 1 on the base module. The module supports RS-232, V.35, V.36, and X.21 interfaces, determined by the cable used. The module can support both DTE and DCE mode.

Rear View

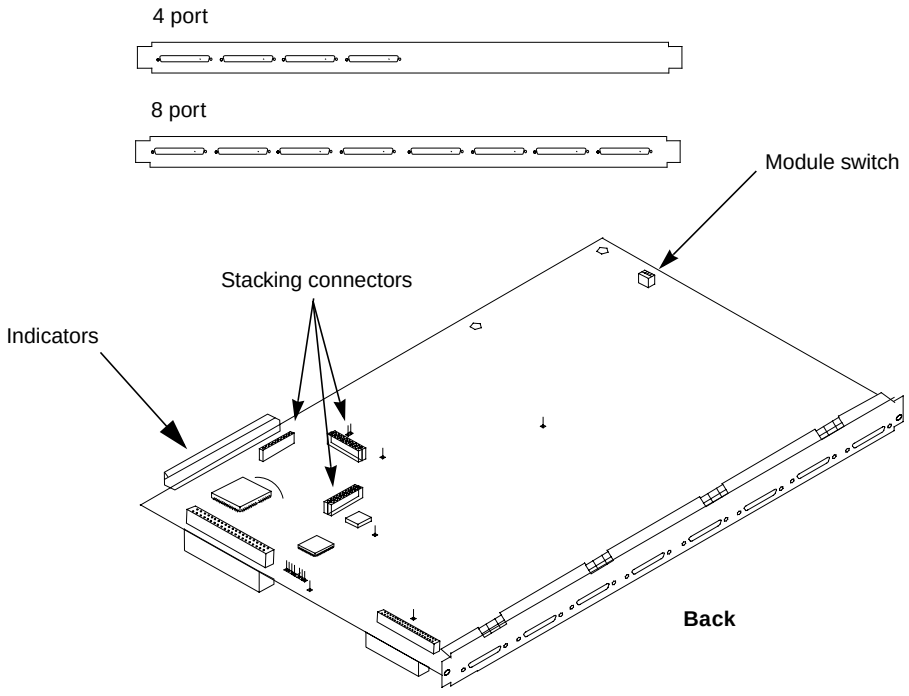
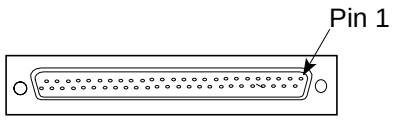


Figure 7-1. High-speed Data Module



MD 50

1, 2	→	Interface Type Indication
3, 28	→	V.35 Transmit Data
4, 29	→	V.35 External Receive Data Clock
5, 30	→	V.35 External Transmit Data Clock
6, 31	→	V.36/X.21 Transmit Data
7, 32	→	V.36/X.21 External Receive Clock
8, 33	→	V.36 External Transmit Clock/X.21
9, 34	←	V.24/RS232/V.35/V.36 Clear to Send/ X.21
10, 35	←	V.24/RS232/V.35/V.36 Data Set Ready
11, 36	←	V.24/RS232/V.35/V.36 Carrier Detect
12	→	V.24/RS232/V.35/V.36 Ready to Send
13	—	Unassigned
14	—	Cable Present Status
15	→	V.24/RS232 External Receive Data Clock
16	→	V.24/RS232 Transmit Data
17	←	V.24/RS232 Transmit Data Clock
18	—	DTE Signal Return
19, 38, 44	—	Reserved
20, 45	←	V.35/V.36/X.21 Receive Data
21, 26	←	V.35/V.36/X.21 Transmit Data Clock
22, 47	→	V.35/V.36 Receive Data Clock/X.21 Indication
23, 24, 25	←	V.35 Input Termination Ground
26, 27, 39	—	Logic Ground
37	←	V.24/RS232/V.35/V.36 Data Terminal Ready
40	→	V.24/RS232 External Transmit Data Clock
41	←	V.24/RS232 Receive Data
42	←	V.24/RS232 Receive Data Clock
43, 48, 49	—	Logic Ground
50	—	Logic Ground

Figure 7-2. Pin Assignments for all Data Modules

Low-speed Data Services Modules

The Legacy Data Module (LDM) provides interface ports to support legacy data protocols in Passport 4400. Additional interface ports are supported through the use of the Legacy Data Expansion Module (LEM).

Rear View

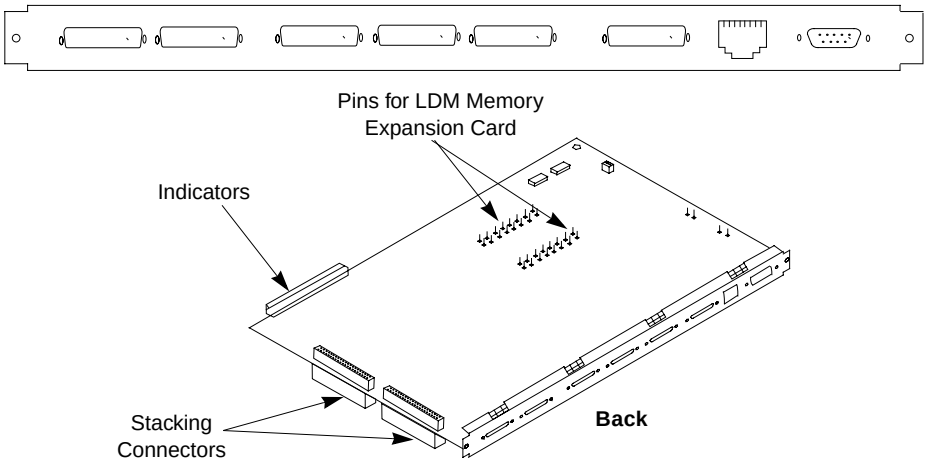


Figure 7-3. Legacy Data Module

Rear View

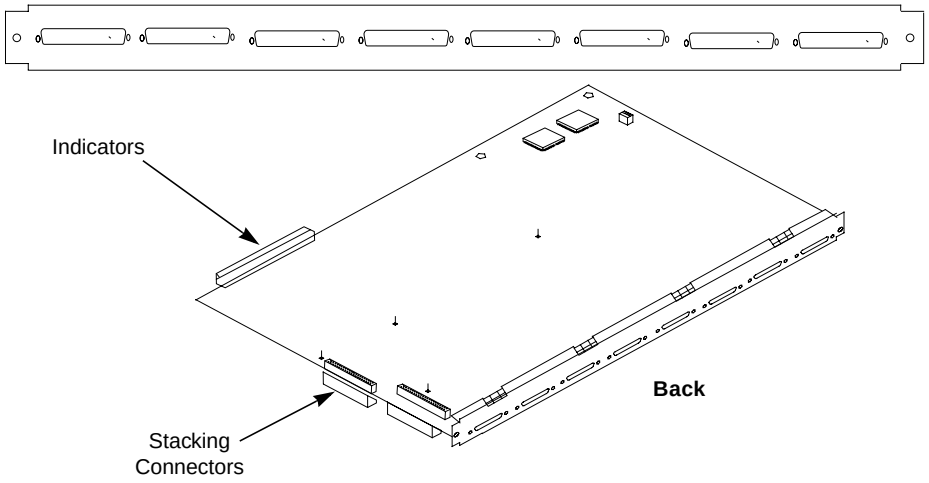


Figure 7-4. Legacy Data Expansion Module

Memory Expansion Card for Legacy Data Module

For Passport 4400 units containing a Legacy Data Module (LDM) and one or more Legacy Data Expansion Modules (LEM), you must order a memory expansion card for the LDM. This memory expansion card provides 1MB of SRAM memory required to support the additional ports provided by the LEM.

To order the LDM memory expansion card, please consult document 800-1959-20, *Passport 4400 Ordering Catalog*. The part number of the card is **NTA150AA**.

Connectors

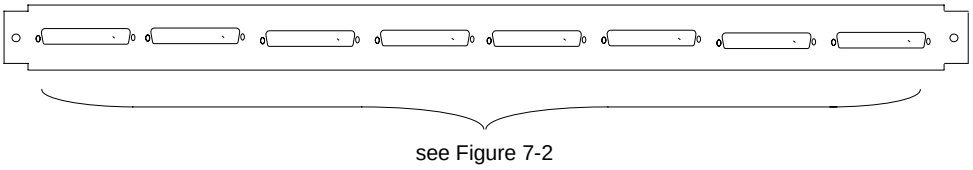


Figure 7-5. Pin Assignments for Legacy Data Expansion Module

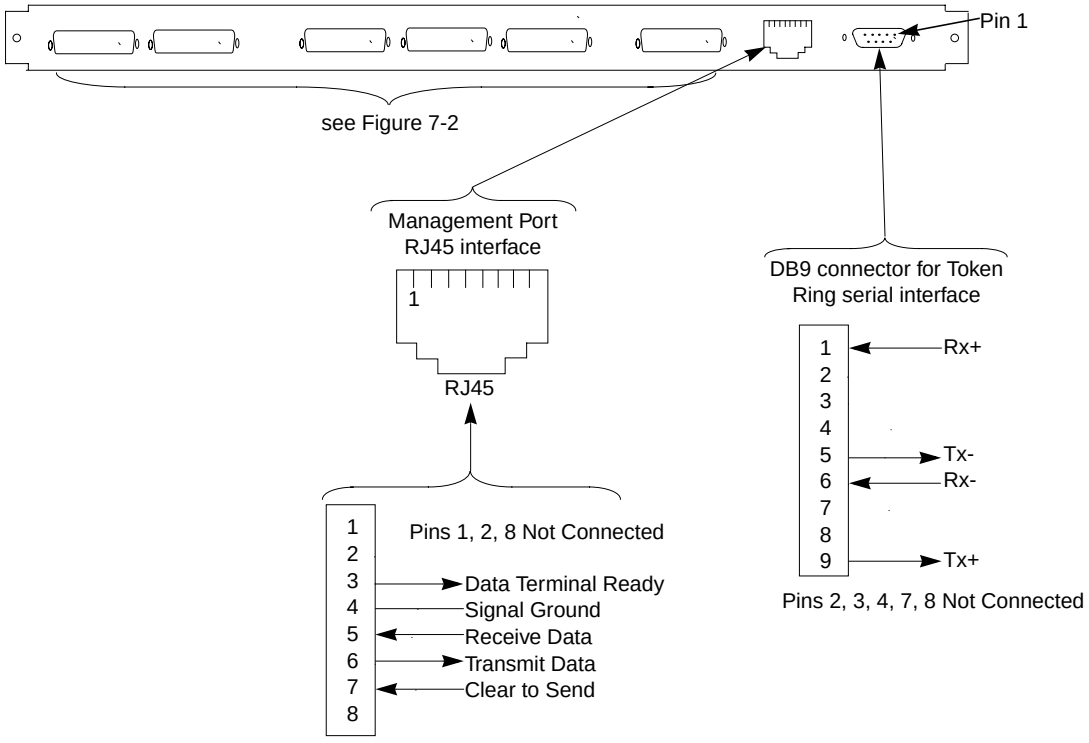


Figure 7-6. Pin Assignments for Legacy Data Module

Analog Voice Modules 8

Analog voice modules provide support for Foreign Exchange Station (FXS), Foreign Exchange Office (FXO), and Ear and Mouth (E&M) analog voice services. The following voice modules are available:

- the Universal Analog Voice Module (UAVM) and its three interface modules (for FXS, FXO, and E&M)
- the single and dual channel Analog Voice Module (AVM).

Universal Analog Voice Module (UAVM)

The Universal Analog Voice Module (UAVM) converts analog voice obtained from a telephone interface into digital form. The digitized signal is transmitted over a data link and routed to a compatible voice/fax channel specified by the destination address. The UAVM consists of a motherboard and one or two interface modules (see Figure 8-3, “Universal Analog Voice Module with Two Interface Modules Installed”).

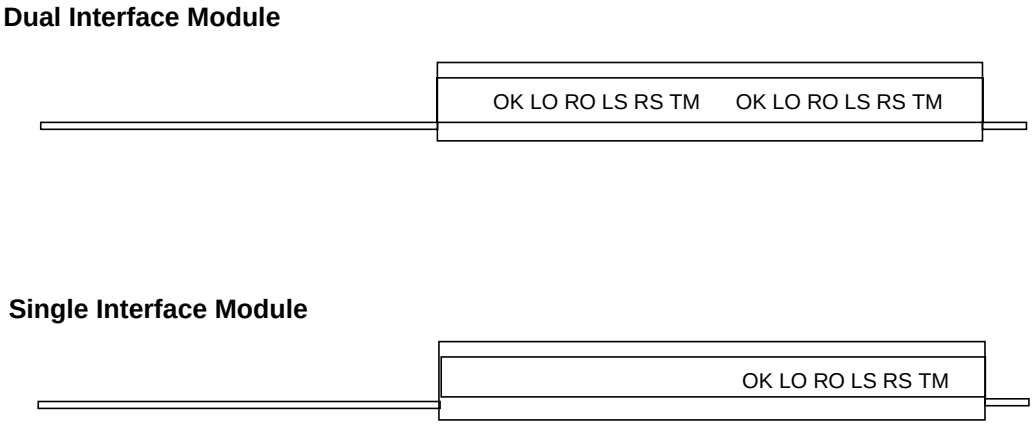


Figure 8-1. Front View and Indicators for Universal Analog Voice Module

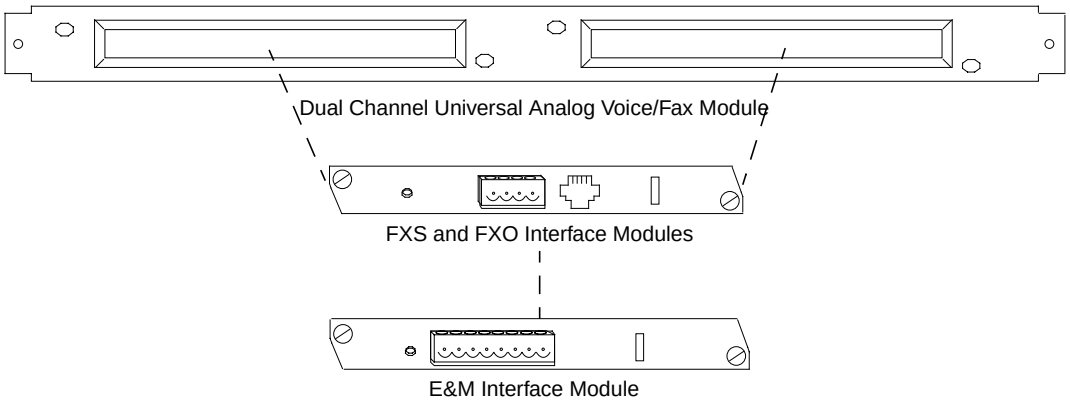


Figure 8-2. Rear View of Universal Analog Voice Module

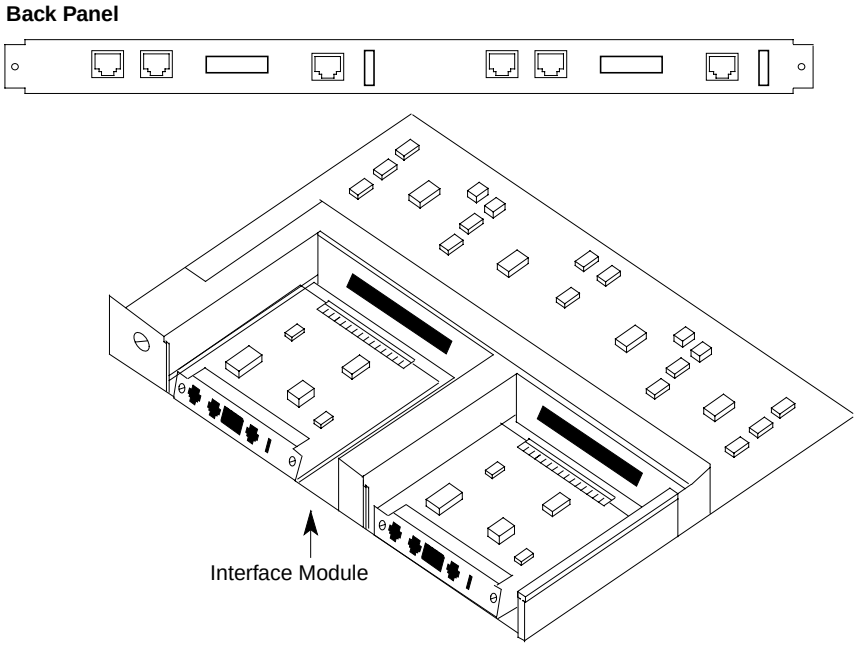


Figure 8-3. Universal Analog Voice Module with Two Interface Modules Installed

Removing an Interface Module

> ***Caution:*** The interface modules cannot be inserted into or removed from the unit while the Passport 4400 is operating. This could cause damage to the Passport 4400 or interruption of network service or both.

Procedure 13: Removing an interface module

1. Facing the rear of the voice/fax module, remove the screw on the left side of the connector cover with the Phillips screwdriver (refer to Figure 8-4).
2. Unhinge the right tab from the slot on the right side of the interface module, then remove the connector cover. Save the screw.
3. Disconnect any modular cables from the RJ11 connectors or unplug the terminal block from the interface.
4. Unscrew the two spring-loaded captive screws with the medium-sized, flathead screwdriver.
5. Grasp the interface module firmly and slide it slowly toward you until it is free of the voice/fax module (Figure 8-5).

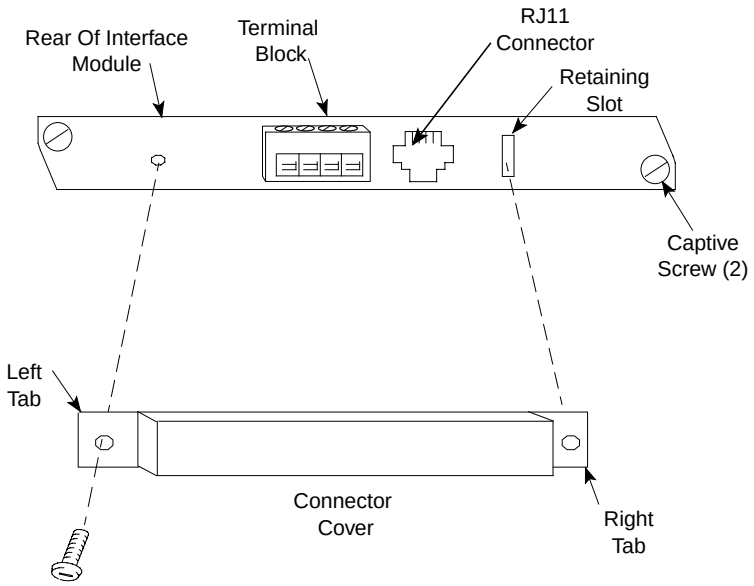


Figure 8-4. Removing the connector cover

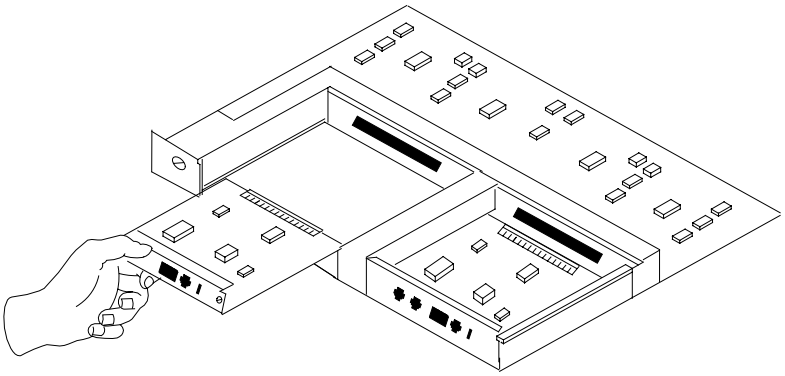


Figure 8-5. Removing the Interface Module

Inserting an Interface Module

> ***Caution:*** The interface modules cannot be inserted into or removed from the unit while the Passport 4400 is operating. This could cause damage to the Passport 4400 or interruption of network service or both.

Procedure 14: Inserting an interface module

1. Place the interface module within the channel.
2. Slide the module toward the rear of the device until it is firmly seated in its mating connector on the voice/fax module.
3. Secure the interface module with the two spring-loaded captive screws (refer to Figure 8-5).
4. Reconnect the modular cable to the RJ11 connectors if required.

   Most FXS and FXO interface module applications use a modular cable to connect the voice/fax channel to the telephone equipment. Connect one end of the cable to the FXS/FXO modular jack on the interface module and the other end to the telephone equipment.
5. Reconnect the cable to the terminal block if required. If you are connecting a telephone interface cable to the terminal block for the first time, refer to "Interface Modules" on page 8-5 for details. You will need the small flat-head screwdriver to secure the individual cable leads.
6. Replace the connector cover by inserting the right tab of the cover in the retaining slot of the interface module, then secure on the left side with the Phillips-head screw.

Interface Modules

FXS and FXO Interface Modules

Except for the type designation, the FXS and FXO interface modules have identical telephone interface connectors on the back panel. Each consists of an RJ11 modular jack labeled FXS or FXO and a 4-pin terminal block; see Figure 8-6, “FXS and FXO Interface Modules.” Both are shielded by a protective cover. Their schematic equivalents are shown in Figure 8-6, “FXS and FXO Interface Modules.”

The terminal block is fitted with a female plug. Individual cable leads are connected to this plug to form a telephone interface cable.

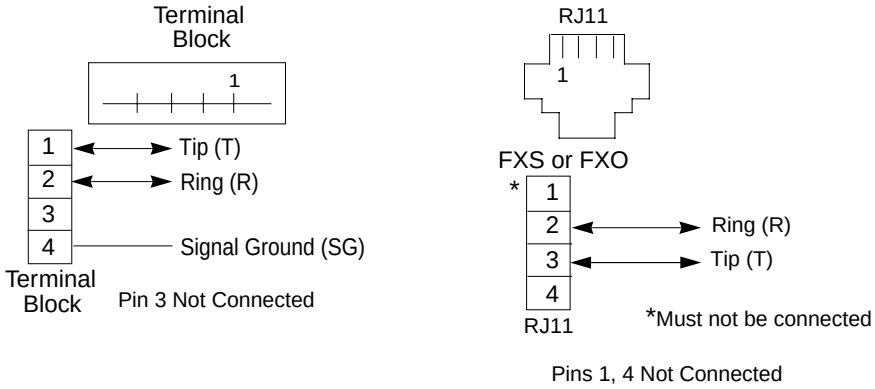


Figure 8-6. FXS and FXO Interface Modules

FXS Interface Stapping

There are a total of six movable straps located on the FXS interface module, E1 through E6 (see Figure 8-8). These straps are reserved for factory use only. They must not be altered by the user.

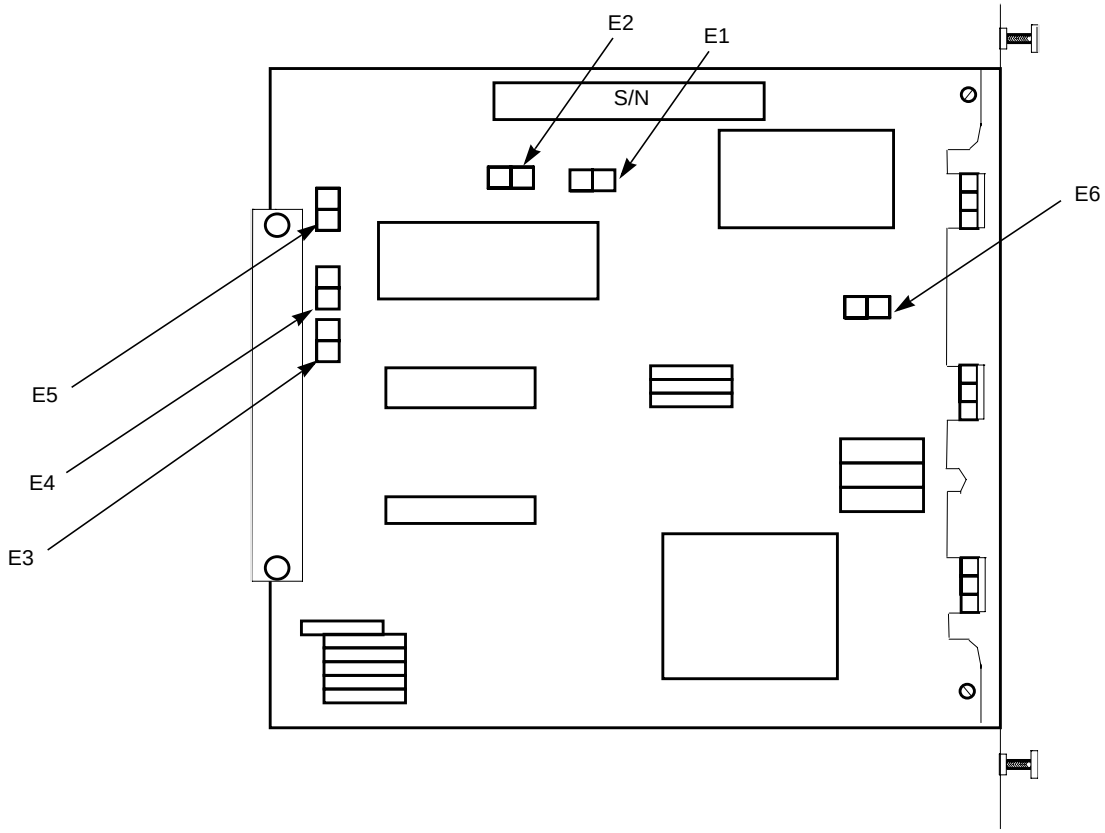


Figure 8-7. Location of Straps on the FXS Interface Module

FXO Interface Strapping

The FXO interface is designed to meet regulatory agency requirements unique to selected countries (such as Spain, France, and Germany). This module contains special straps that implement the requirements of each country.

There are 13 movable straps located on the FXO interface module, E1 through E13. The following four figures show the locations of these straps. The straps function as follows:

- Straps E1 through E5 are reserved for factory use only. They must not be altered by the user.
- Five different strapblocks (E6/E7, E8/E9, E10/E11, E13/E14, and E15/E16) are used to select the country of operation.
- Strap E12 is reserved for factory use only. It must not be altered by the user.

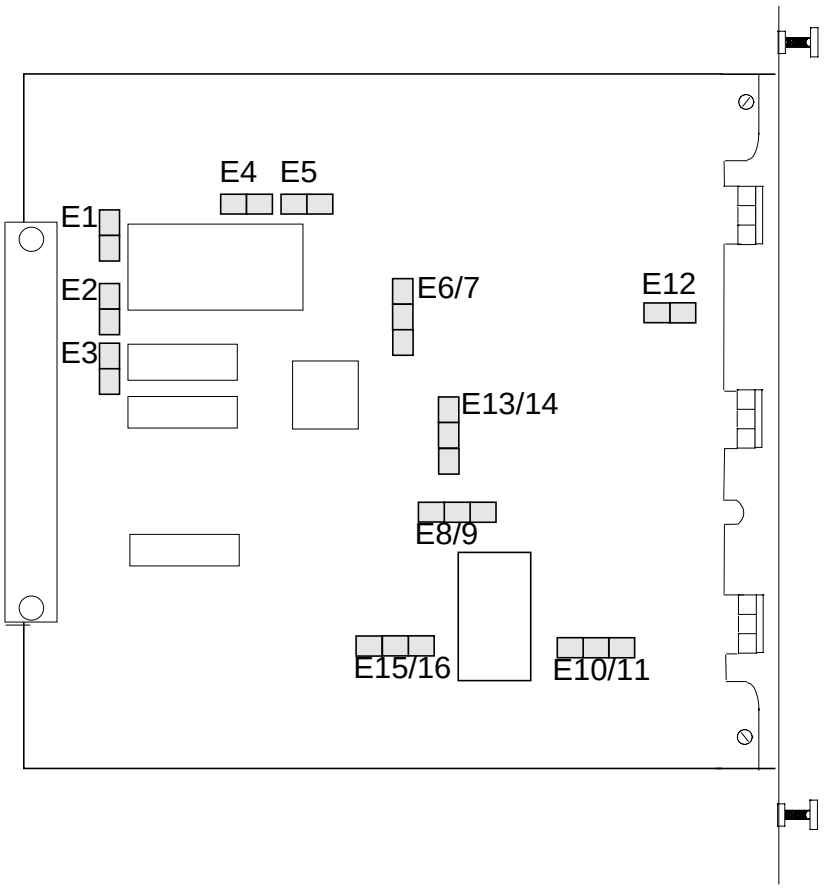


Figure 8-8. Location of straps, FXO Interface Module

Country-specific Strap Settings

> ⚠ ***Caution:*** The following figures give specific instructions on strapping the FXO Interface Module for use in Spain, France, Germany and Switzerland. The module is factory shipped with a default setting that operates correctly in all other countries. If this module is NOT to be used in one of the countries listed above, do not adjust the straps.

France

- Locate the strapping block labeled E6/E7. Place the strap over the pins marked E6.
- Locate the strapping block labeled E13/E14. Place the strap over the pins marked E13.
- Leave other strapping blocks (E8/E9, E10/E11, E15/E16) in their default positions.

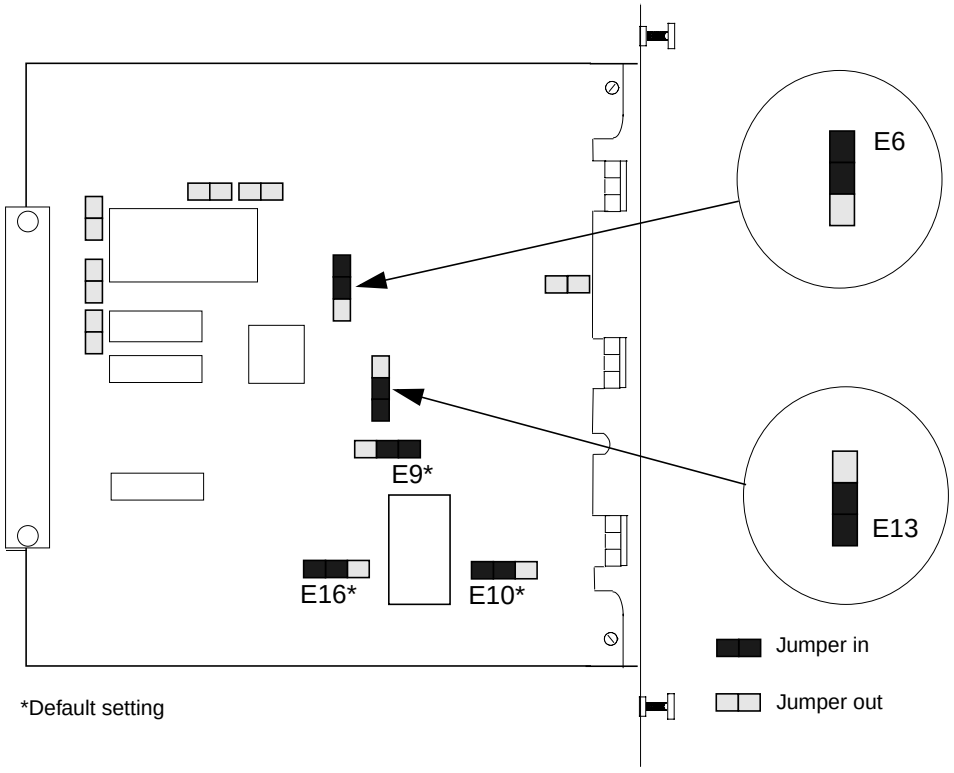


Figure 8-9. Strapping the European FXO Module - France

Spain

- Locate the strapping block labeled E8/E9. Place the strap over the pins marked E8.
- Locate the strapping block labeled E10/E11. Place the strap over the pins marked E11.
- Leave other strapping blocks (E6/E7, E13/E14, E15/E16) in their default positions.

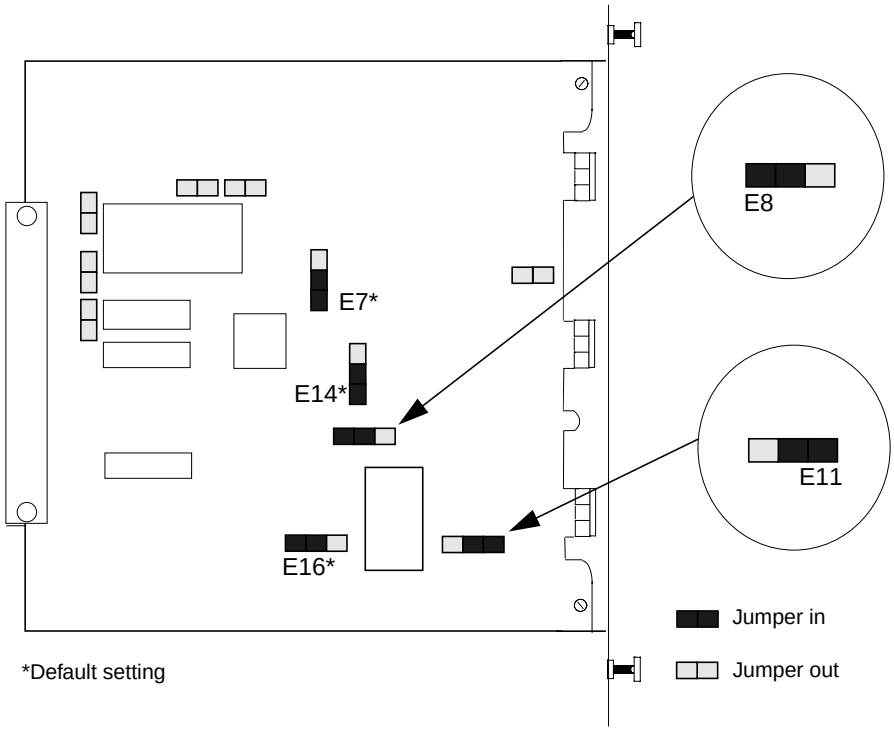


Figure 8-10. Strapping the European FXO Module - Spain

Germany and Switzerland

- Locate the strapping block labeled E15/E16. Place the strap over the pins marked E15.
- Leave other strapping blocks (E6/E7, E8/E9, E10/E11, E13/E14) in their default positions.

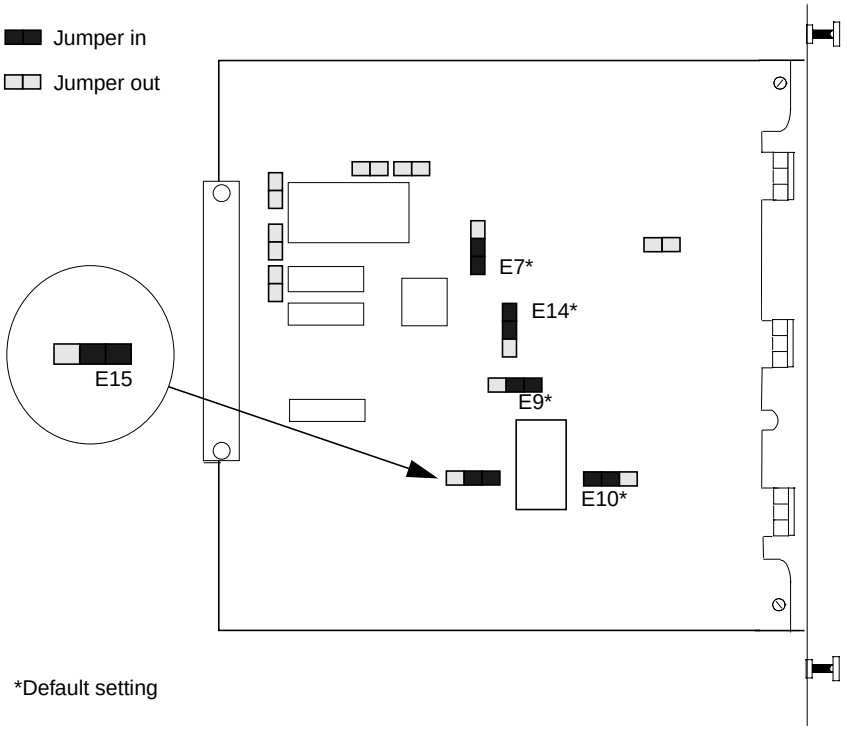


Figure 8-11. Strapping the European FXO Module - Germany and Switzerland

E&M Interface Module

The E&M interface module telephone interface signals are terminated in an 8-pin tie trunk terminal block on the back panel (see Figure 8-12, "E&M Interface Module, Back Panel Connector"). This connector is fitted with a female plug. Individual cable leads are connected to this plug to form a telephone interface cable.

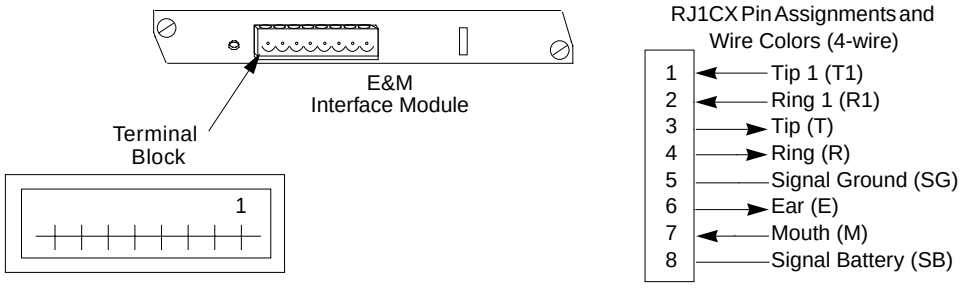


Figure 8-12. E&M Interface Module, Back Panel Connector

E&M Strapping

There are a total of 22 straps on the E&M interface module (see Figure 8-13, "Location of Straps, E&M Interface Module"). Their functions are as follows:

- E1 through E5. These straps are reserved for factory use only. They must not be altered by the user.
- E6, E7, and E9 through E13. These straps are used to select signaling types I, II, and V.
- Straps E8 and E17 are normally installed to shunt out DC blocking capacitors C36 and C38. They must be removed in case there are DC voltages present in the R and R1 leads.
- Strap E14 is used to shunt out the series resistor in the E lead in case the loop resistance is too high to trip the detector inside the PBX. If cabling is short, try removing the strap.
- Strap E15 is used for dial pulse correction; it connects a 1-µf filter capacitor between the SG lead and ground.
- Strap E16 is used to shunt out the series resistor in the SB lead in case the loop resistance is too high to trip the detector inside the interface module. If cabling is short, try with the strap removed.
- Straps E18 and E19 are reserved for factory use only. They must not be altered by the user.
- Straps E20, E21, and E22 are spares.

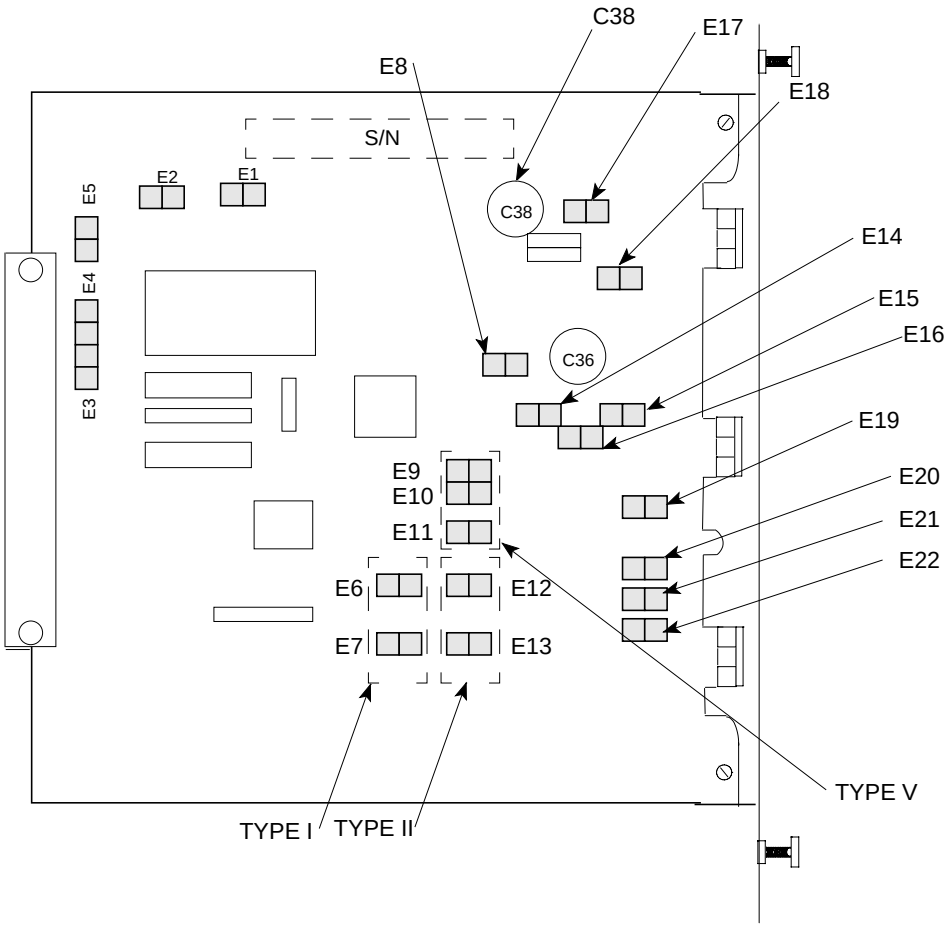


Figure 8-13. Location of Straps, E&M Interface Module

Analog Voice Module (AVM)

The Analog Voice Module converts analog signals to digital for processing by the Passport 4400 unit. FXS, FXO, and E&M interfaces are determined by changing the straps on the front of the module's circuit board.

Dual Channel Analog Voice Module

Single Channel Analog Voice Module

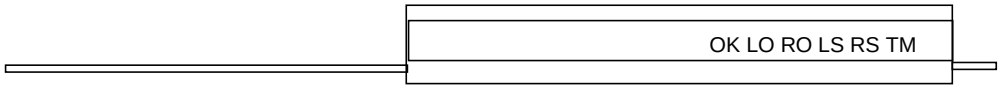
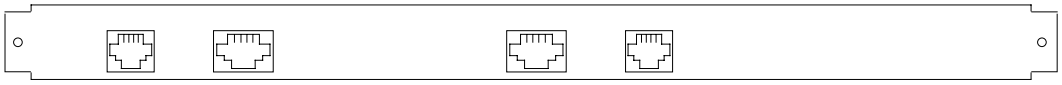


Figure 8-14. Front View and Indicators for Analog Voice Module

Dual Channel Analog Voice



Single Channel Analog Voice

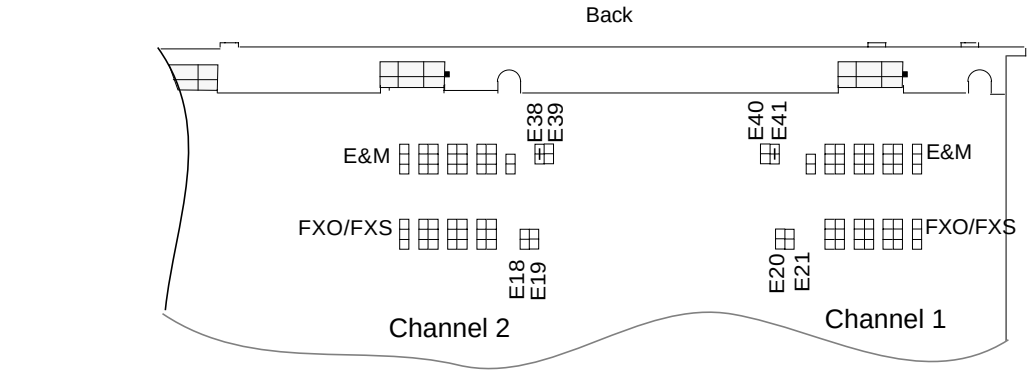
Figure 8-15. Dual and Single Analog Voice Modules

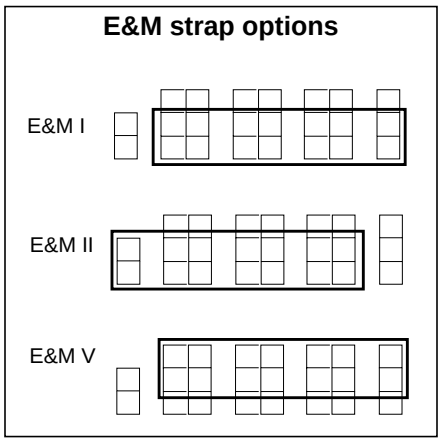
Strapping

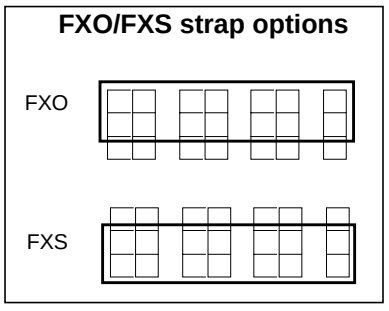
Strapping involves matching the voice/fax channel with the attached telephone interface. Specifically, the voice/fax channel may be strapped, depending on the application, for one of three common types of signaling conventions: FXS (Foreign Exchange Station), FXO (Foreign Exchange Office), or E&M (Ear and Mouth).

AVMs installed in units are usually prestrapped to the interface type specified in the order. Restrap only if you add a new AVM, if your interface requirements change, or if your interface requirements are different from the way you ordered. them. You may also need to temporarily restrap a voice/fax module if you perform a level setting procedure. To verify the settings of your voice/fax channel(s) without physically inspecting them, refer to 800-1952-20, *Passport 4400 Operator's Manual*.

- In a dual-channel AVM, each channel may be strapped for a different signaling convention.
- Place a strap over E41 (or E38 for Channel 2) if the cable to the PBX is too long.
- Place a strap over E21 (or E18 for Channel 2) to connect the battery ground to the SG lead.
- To select E&M, FXO, or FXS for each channel, consult the strap options listed in Figure 8-16 below.







Note: Channels 1 and 2 have the same strap options, but the straps for Channel 2 are arranged in the opppsite direction (mirrored left/right in the diagram above).

Figure 8-16. Location of AVM Straps

Figure 8-17, "Telephone Interface Cable Connections," shows the connector locations, pin assignments and wire colors of a dual channel AVM. Single channel modules have only one set of interface connectors. Use a modular cable to connect to the applicable telephone interface. Cables are supplied.

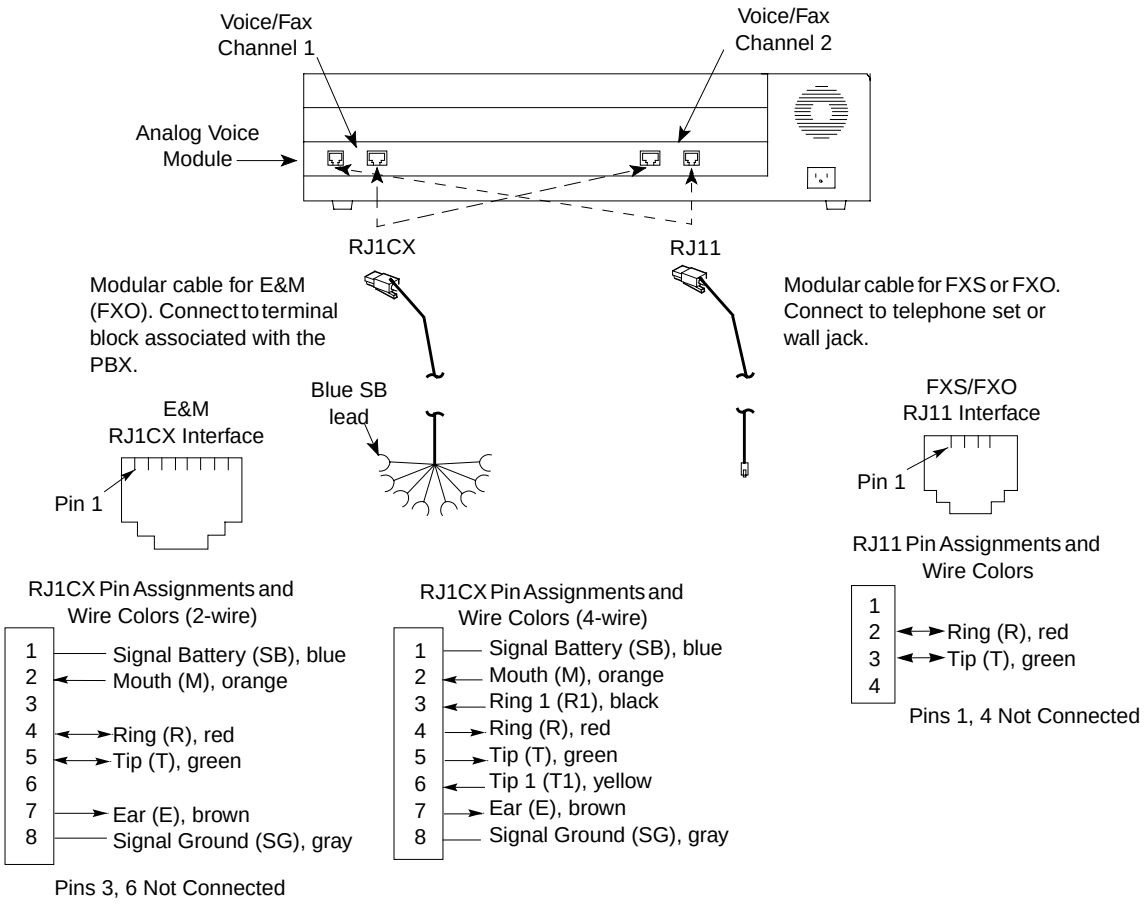

Voice/Fax Channel 1
Voice/Fax Channel 2
Analog Voice Module
RJ1CX
RJ11
Modular cable for E&M (FXO). Connect to terminal block associated with the PBX.
Modular cable for FXS or FXO. Connect to telephone set or wall jack.
Blue SB lead
E&M RJ1CX Interface
Pin 1
FXS/FXO RJ11 Interface
Pin 1
RJ11 Pin Assignments and Wire Colors
1
2 Ring (R), red
3 Tip (T), green
4
Pins 1, 4 Not Connected
RJ1CX Pin Assignments and Wire Colors (2-wire)
1 Signal Battery (SB), blue
2 Mouth (M), orange
3
4 Ring (R), red
5 Tip (T), green
6
7 Ear (E), brown
8 Signal Ground (SG), gray
Pins 3, 6 Not Connected
RJ1CX Pin Assignments and Wire Colors (4-wire)
1 Signal Battery (SB), blue
2 Mouth (M), orange
3 Ring 1 (R1), black
4 Ring (R), red
5 Tip (T), green
6 Tip 1 (T1), yellow
7 Ear (E), brown
8 Signal Ground (SG), gray

Figure 8-17. Telephone Interface Cable Connections

T1/E1 and Digital Voice Modules 9

T1/E1 digital voice and data is supported on the 4400 through the use of the modules and components described below:

- **The T1 or E1 Voice Modules (TVM or EVM)**. The TVM or EVM allows a T1 or E1 leased line or PBX to connect directly to a Passport 4400 unit.
- **The Digital Voice Module (DVM)**. The DVM is a SIMM card that is plugged directly into the TVM. EVM or DVEM. Each DVM supports one digital voice channel.
- **The Digital Voice Expansion Module (DVEM)**. The DVEM is an expansion module that contains slots to support additional DVMs. To support a full T1 or E1 link, two DVEMs in addition to the TVM or EVM are required.

T1 and E1 Voice Modules

The T1 Voice Module provides a user interface to two 1.544 Mbps T1 lines. It can support a Maximum of 24 Digital Voice Modules (6 on the module, the rest on Digital Voice Expansion Modules).

The E1 Voice Module provides a user interface to two 2.048 Mbps E1 lines. It can support a maximum of 30 Digital Voice Modules (6 on the module, the rest on Digital Voice Expansion Modules).

Physical Description

On the left side of the module are six connectors that serve as receptacles for six Digital Voice Modules.

Toward the left rear is the module switch group used for setting the location of the module within the 4400. This switch group must be set for LIM B (see Figure 6-1, “Dip Switch Locations”).

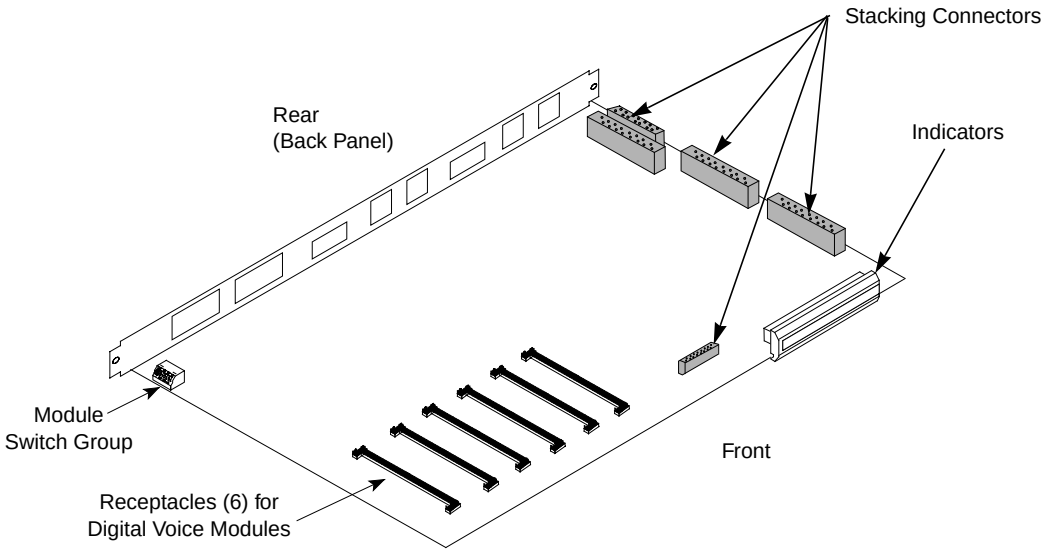


Figure 9-1. T1/E1 Voice Module

On the right front are 13 indicators. Of these, the six on the left are associated with the voice/fax channels represented by the six Digital Voice Modules, while the seven on the right are associated with the Voice Module.

At the center and on the right side are four feed-through stacking connectors used to connect the Voice Module to the base unit module below it and to any expansion module above it.

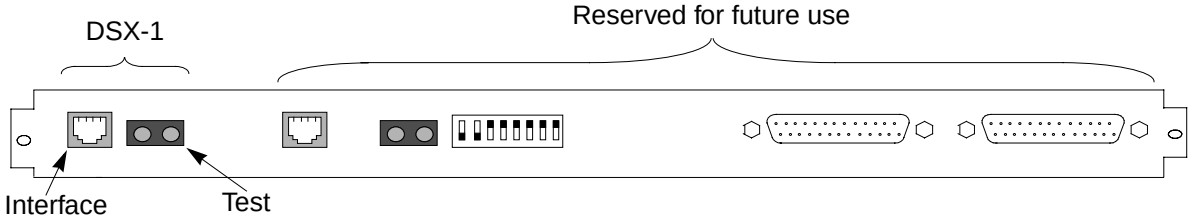


Figure 9-2. T1 Voice Module Rear Panel

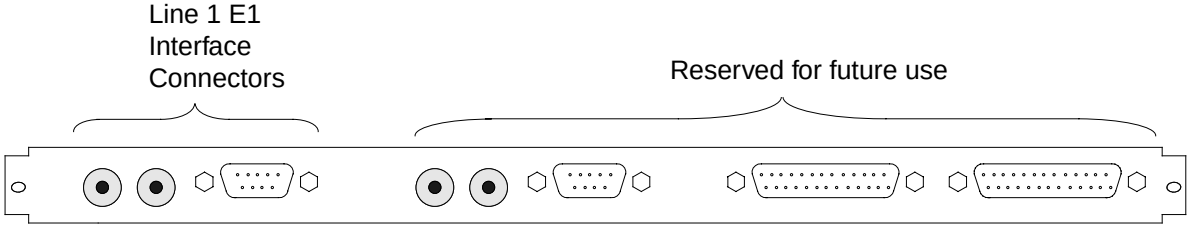


Figure 9-3. E1 Voice Module Rear Panel

Connectors

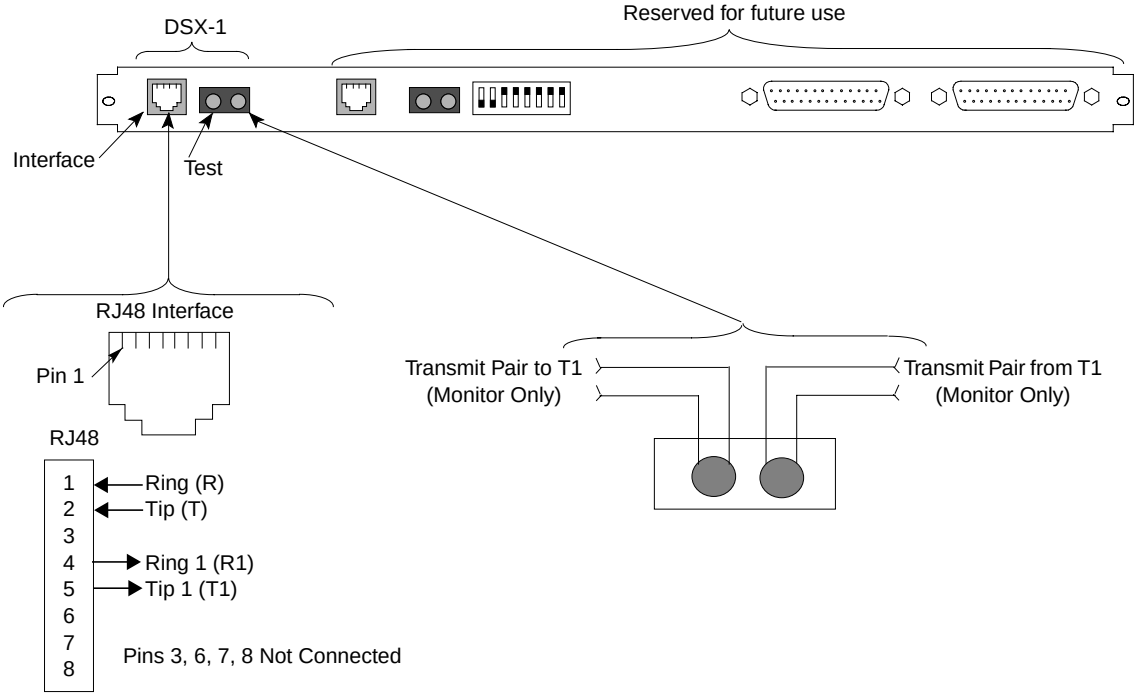


Figure 9-4. Pin Assignments for T1 Voice Module

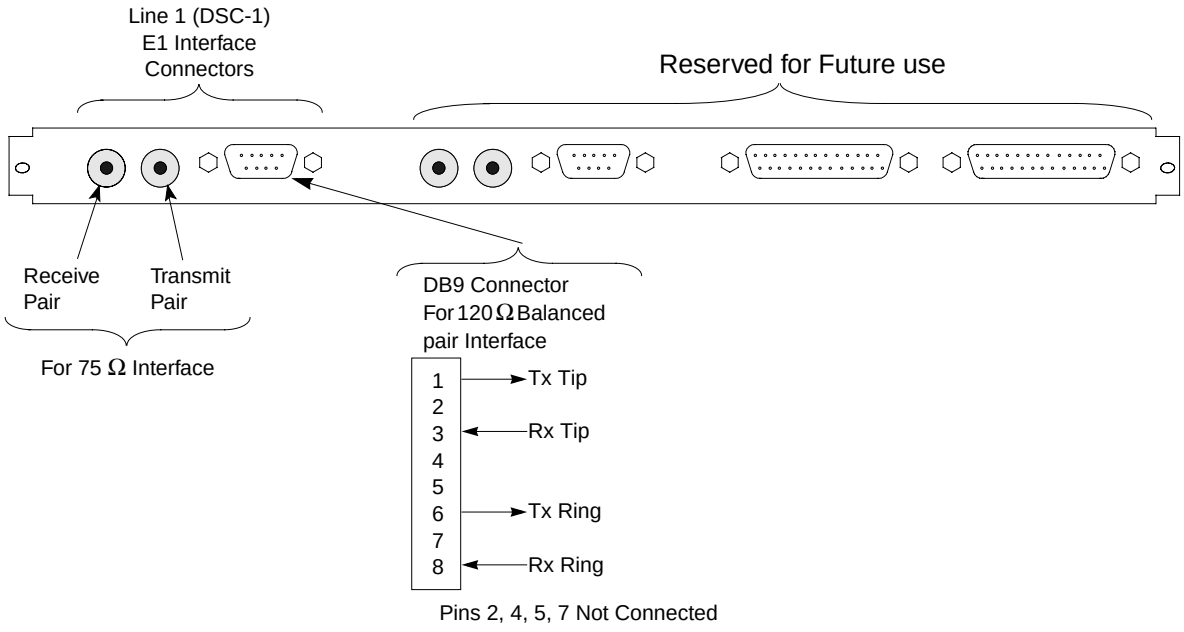


Figure 9-5. Pin Assignments for E1 Voice Module

Strapping

E1 Voice Module Impedance Strapping

Impedance for each E1 interface line is determined by the placement of a header on a jumper located on the E1 module. Impedance for each interface line may be straped for either 75 Ω or for 120 Ω. The two lines may be strapped for the same or for different impedance.

> ⚠ ***Caution:*** For operation in the United Kingdom, this equipment may not be connected to an E1 Digital service using the 75 Ω interface.

The locations of the two impedance straps are shown for line 1 in the following figure.

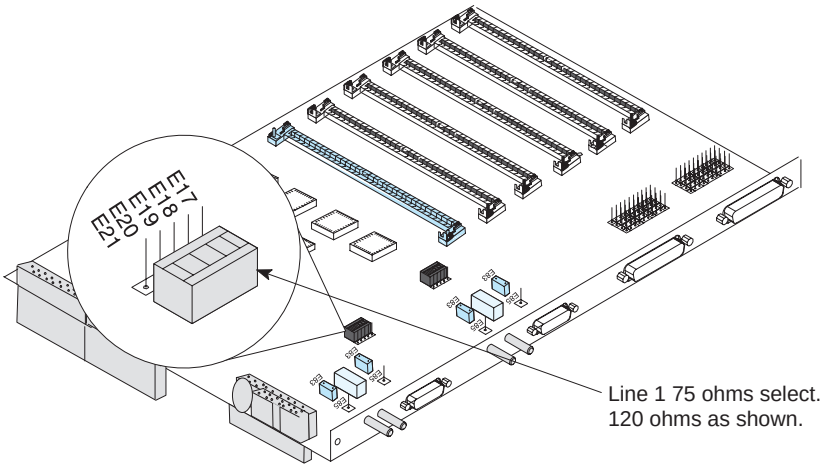


Figure 9-6. Location of the E1 Interface Line Straps

75 Ω Outer Conductor Strapping

The outer conductors of the 75 Ω BNC interface connectors may be connected to earth or isolated. Strapping is implemented by a set of headers and jumpers as shown in the following figure.

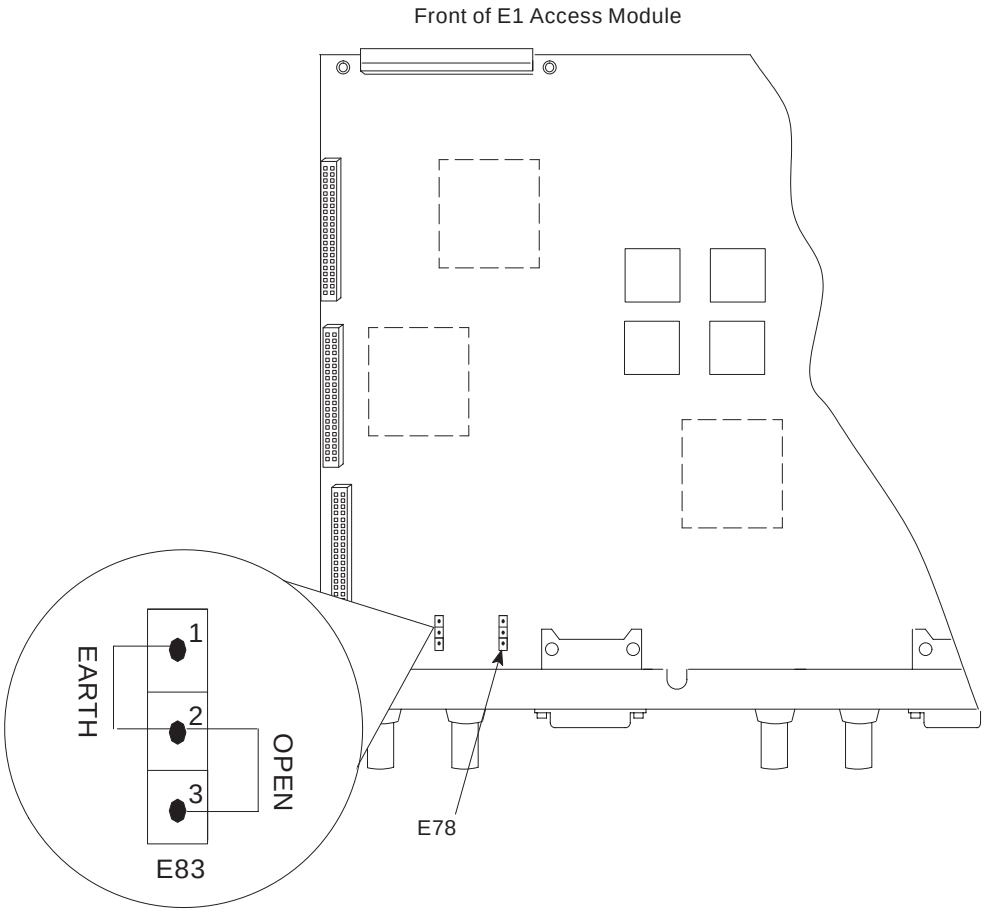


Figure 9-7. Location of the E1 Interface Line Straps

75 Ω Connector Outer Conductor Jumper

Connector	To Earth	Isolated (Open)
Line 1 Rx (DSX-1)	Place jumper over E83, pins 1 and 2.	Place jumper over E83, pins 2 and 3.*
Line 1 Tx (DSX-1)	Place jumper over E78, pins 1 and 2.*	Place jumper over E78, pins 2 and 3.
* Indicates factory default setting		

Digital Voice Expansion Module (DVEM)

The Digital Voice Expansion Module houses a maximum of 12 Digital Voice Modules (DVMs). It serves as an extension to the 6 DVMs mounted on the associated T1/E1 Voice Module.

Physical Description

The Digital Voice Expansion Module has 12 receptacles arranged in three groups of four to house 12 Digital Voice Modules. Toward the rear is the module switch group used for configuring the physical location of the module within the Passport 4400 device.

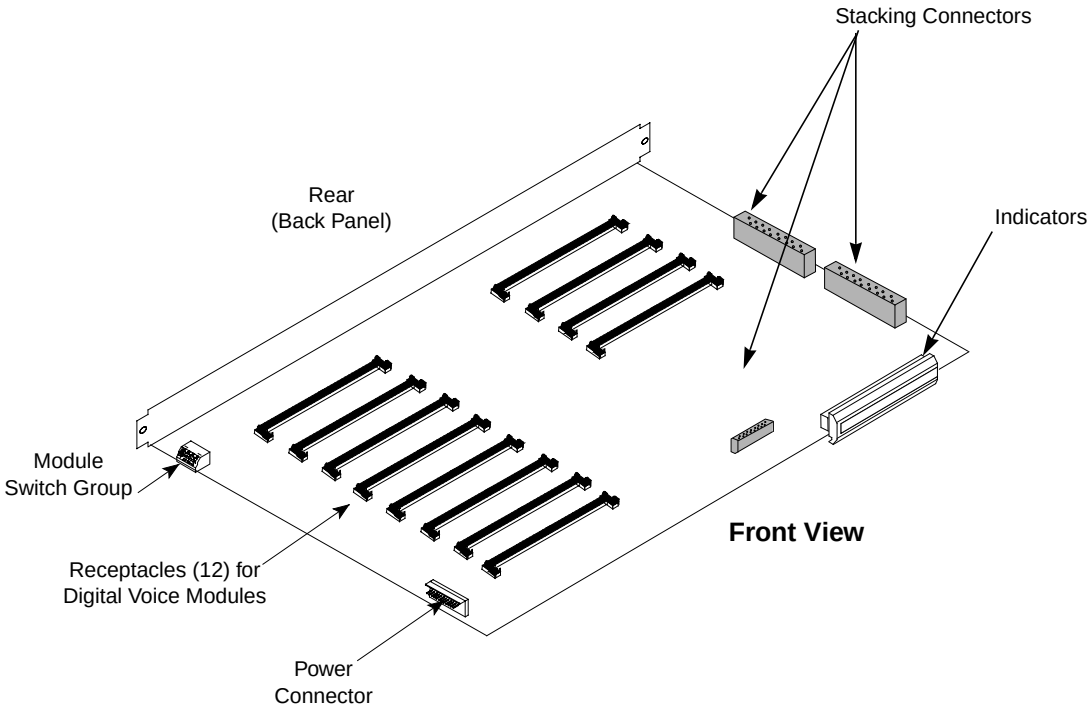


Figure 9-8. Digital Voice Expansion Module

On the right front are 13 indicators. At the center and on the left side are three feed-through stacking connectors used to connect the Digital Voice Expansion Module to the T1/E1 Voice Module below it and to any expansion module above it.

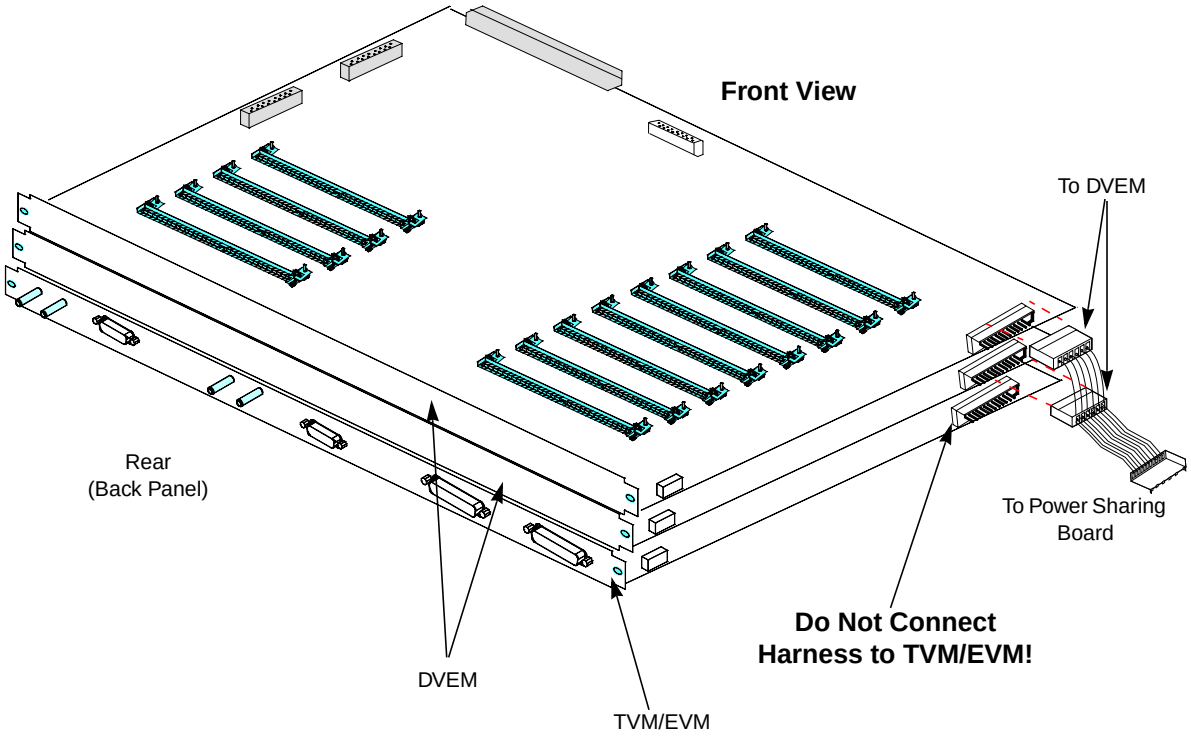
Note: The Digital Voice Expansion Module must be physically installed directly on top of the T1/E1 Voice Module or another Digital Expansion Module.

DVEM Power Harness

For Passport 4400 units containing one or two Digital Voice Expansion Modules, a DVEM power harness must be installed. The power harness provides additional power to the DVEM boards (see Figure 9-9).

The DVEM power harness must be ordered separately – please consult document 900-1959-20, *Passport 4400 Ordering Catalog*. The part number of the harness is **NTAU32AA**.

Note: Do not connect the DVEM power harness to the T1/E1 Voice Module. If your Passport 4400 contains only one DVEM, there will be an additional, unused connector on the power harness (this connector would normally plug into a second DVEM). In this case, leave the spare connector unconnected.



TVM = T1 Voice Module
EVM = E1 Voice Module
DVEM = Digital Voice Expansion Module

Figure 9-9. DVEM Power Harness

Digital Voice Module (DVM)

The Digital Voice Module is a single in-line memory module (SIMM). It compresses 64 Kbps voice obtained from the T1/E1 line into low-speed channels, thereby optimizing the use of the available bandwidths.

- Up to six may be installed in a T1/E1 Voice Module
- Up to 12 may be installed in Digital Voice Expansion Module.

Physical Description

The Digital Voice Module is a daughter board that plugs into a connector on top of the T1 Voice Module, E1/T1 Voice Module, or Digital Voice Expansion Module.

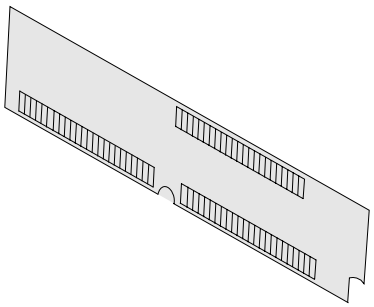


Figure 9-10. Digital Voice Module

Installing Digital Voice Modules

> ⚠ ***Warning:*** Do not attempt to remove or install a Digital Voice Module while power is connected to the Integration Unit that houses the T1 Voice Module or the E1 Voice Module. Be sure to disconnect the Integration Unit from the power source.

Procedure 15: Installing a Digital Voice Module

1. Orient the Digital Voice Module in a vertical position, with the applicable connector on the right side.
2. Place the bottom of the Digital Voice Module in the groove formed by the T1 Voice Module or the E1 Voice Module (or Digital Voice Expansion Module) connector pins, and align the notch in the Digital Voice Module with the tab in the center of the connector.
3. Push down firmly on the Digital Voice Module, then turn it slowly downward approximately 20 degrees until it is latched in position.
4. Repeat steps 1 through 3 to install the remaining Digital Voice Modules.

Procedure 16:

Removing a Digital Voice Module

1. Unlatch the first Digital Voice Module from its mating connector in the T1 Voice Module, the E1 Voice Module, or the Digital Voice Expansion Module. To do that, press your thumbs against the latch springs at either end of the module, and with your forefingers turn the Digital Voice Module into the upright position.
2. Lift the Digital Voice Module out of the connector.
3. Repeat steps 1 and 2, and sequentially remove the remaining applicable Digital Voice Modules.

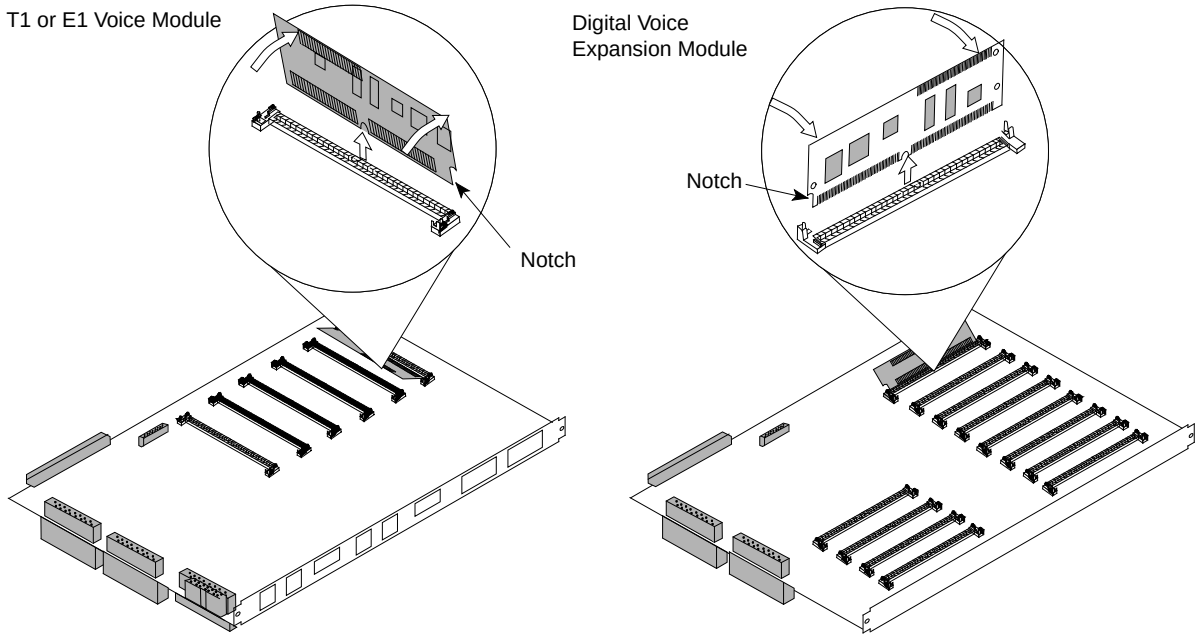


Figure 9-11. Digital Voice Module Replacement

Power Supplies 10

dc Power Supplies

The dc power supply system allows the 4400 to be installed in a telephone company environment with the necessary dc power input being furnished by the telephone company to the input of the 4400.

The -48 volts dc version of the 4400 power supply system is identical to the ac version except for the addition of a terminal power adapter that plugs into the line cord Electronic Industry Association (EIA) jack on back of the unit. The five power supplies stack identically to the AC version. The connectors accept the same cables for input and output power.

The dc input voltage must be within the range of -32 volts dc and 72 volts dc. The plus (+) and minus (-) markings on the input power adapter box indicate the polarity of corresponding battery connections. They are electrically floating and can either be connected to house ground or the appropriate dc return. An additional case ground screw is also on the power adapter box. This connection must be grounded to the chassis safety ground for safety and electrical noise suppression. Do not operate the unit without the ground screw connected to the safety ground.

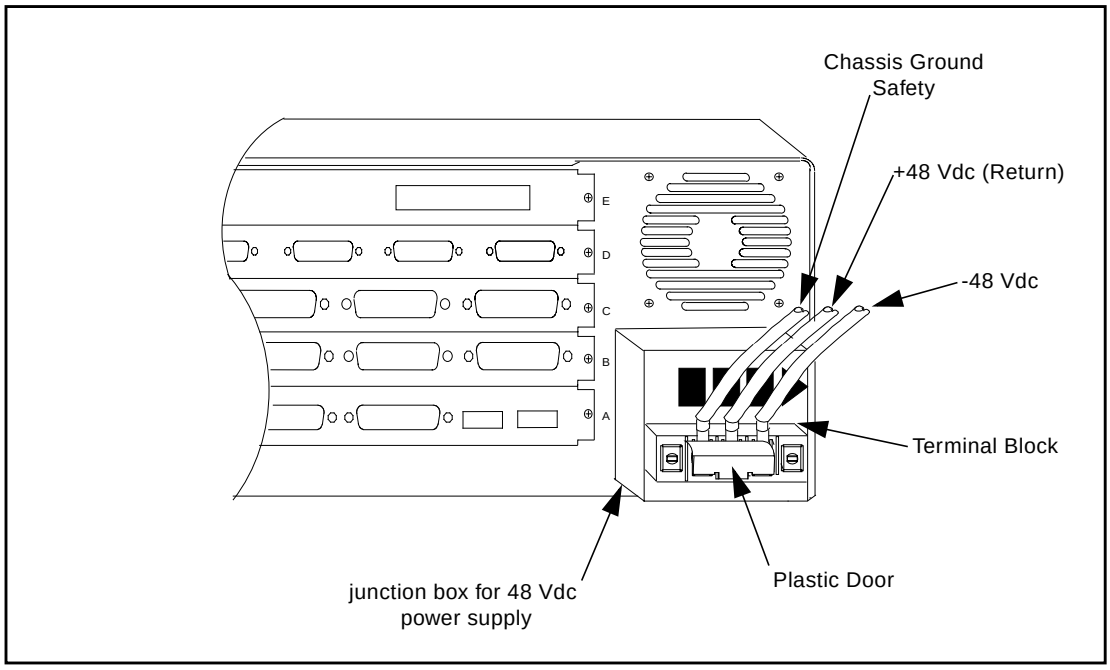


Figure 10-1. dc Power Supply

Chassis types

Three-slot Chassis (model 4430)

The three-slot chassis uses a 135W ac power supply to provide power to the Ethernet Base Module and expansion modules.

Note: The three-slot Passport 4400 uses ac power only. There is no option for dc power.

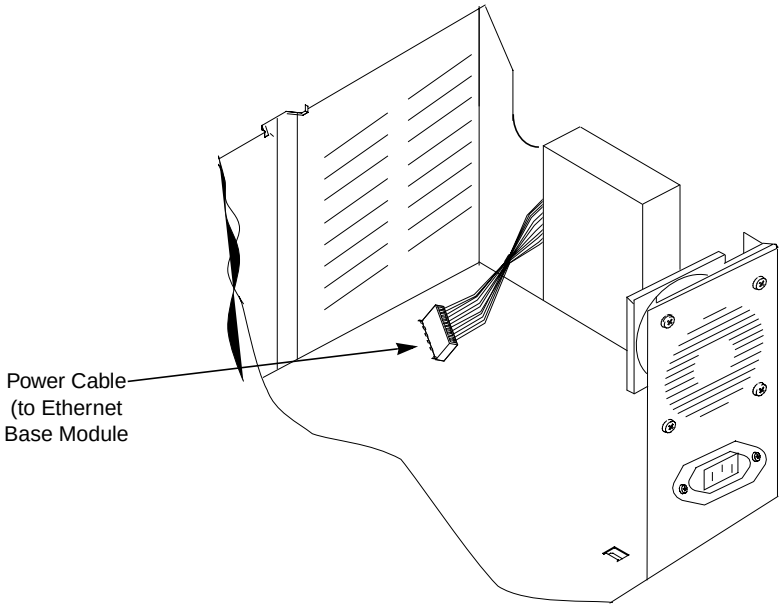


Figure 10-2. 3-slot Power Supply

The power cable connects to the Ethernet Base Module. All expansion modules in the unit draw power from the Ethernet Base Module through stacking connectors on the modules.

Five-slot Chassis (model 4450)

The five-slot chassis uses a 160W power supply to provide power to the Ethernet Base Module and expansion modules. Both ac and dc models are available; the figure below shows an ac unit.

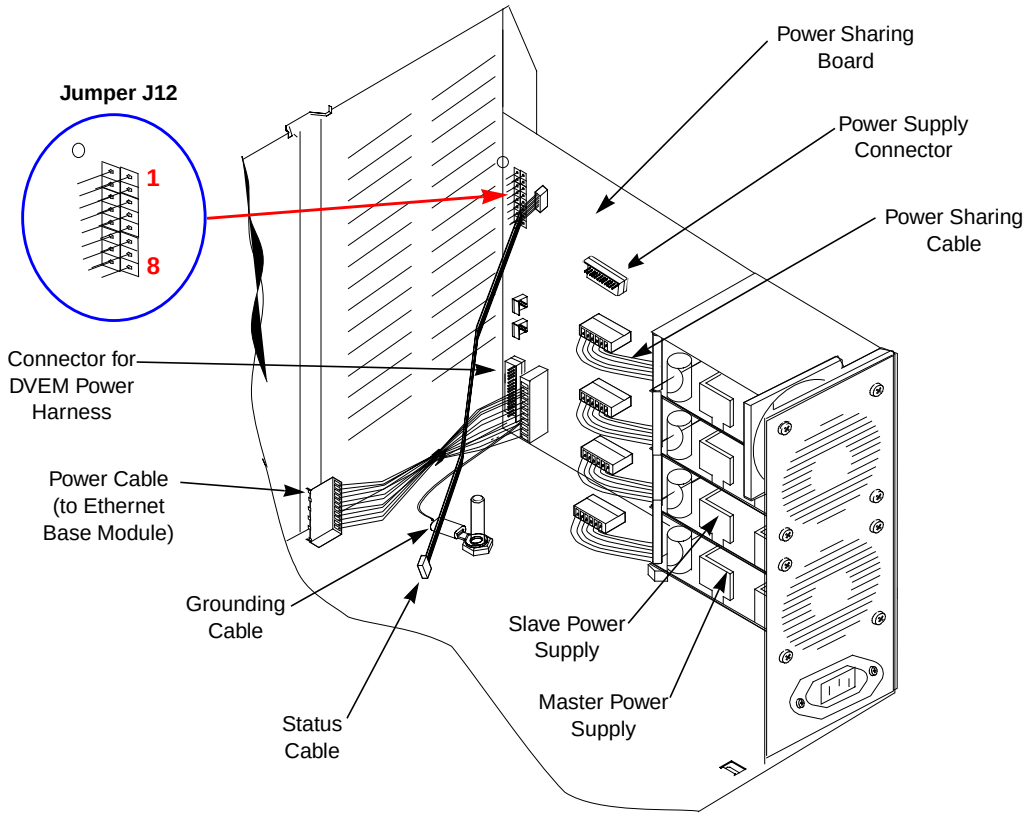


Figure 10-3. 5-slot Power Supply

DVEM Power Harness

The DVEM power harness provides redundant power for Passport 4400 units containing one or more DVEM modules. The power harness connects the DVEM modules to the power sharing board. See Section 9, “T1/E1 and Digital Voice Modules,” for more information.

Five-slot Chassis with Redundant Power Supply (model 4450R)

A Passport 4400 unit with the redundant power supply option contains a subassembly that houses extra power supplies. It provides an extra power supply in the event that one of the original four fails.

Two indicator lights that monitor the power supplies are located at the top right side of the front bezel. The triangle-shaped (green) indicator is lit when all power supplies are working properly. The rectangle-shaped (red) indicator lights up when there is a problem with one or more power supplies in the unit, or when too many power supplies are connected (refer to Table 10-1).

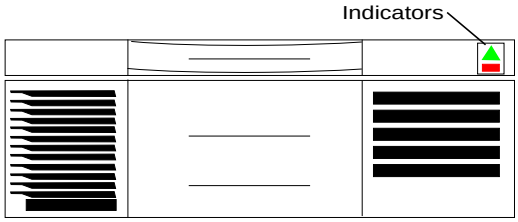


Figure 10-4. Indicators for Passport 4400 with Redundant Power Supply

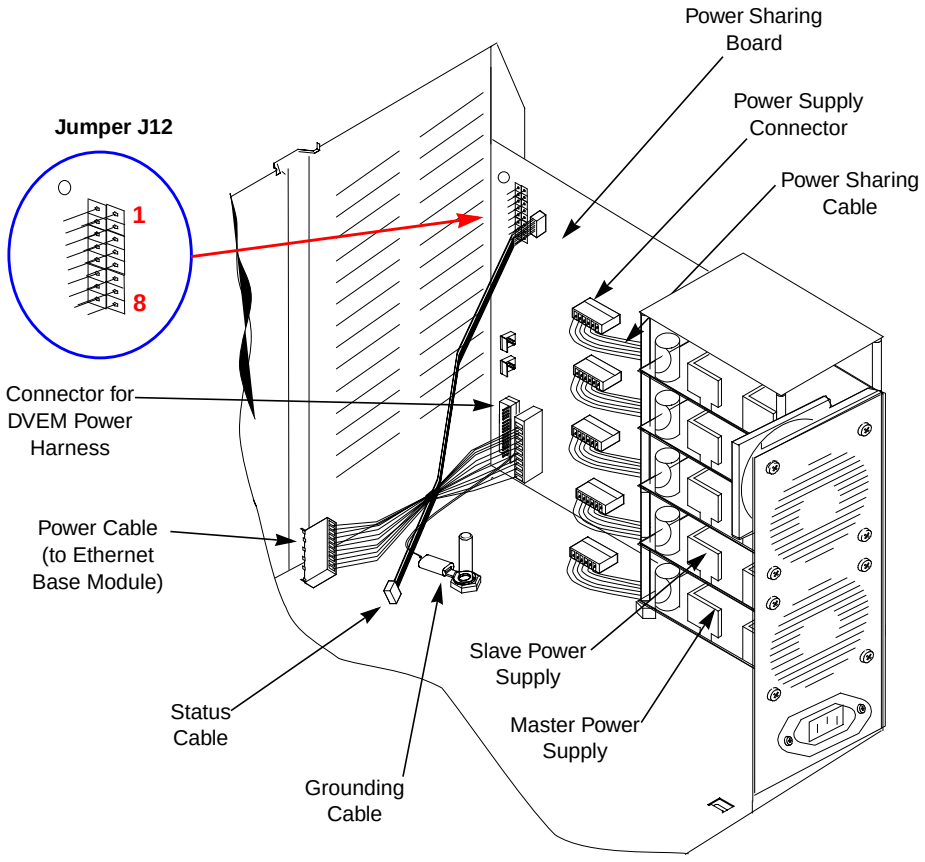


Figure 10-5. 5-slot Redundant Power Supply

Configuring the Power Supplies

Note: The following information applies to five-slot Passport 4400 units only (models 4450, 4450R). Three-slot units (model 4430) do not need to be configured.

The power supply at the bottom of the stack is called the master supply. All other supplies located above the master are called slave supplies. The five-slot models have one master and either three (4450) or four (4450R) slave power supplies.

If adding new modules to a unit, ensure that the power supplies are properly configured by following these procedures.

> ⚠ ***Caution:*** Disconnect all power from the unit before performing these procedures.

Table 10-1. Configuring the Power Supplies

For Units Containing...	4400 with Standard Power Supply	4400 with Redundant Power Supply	ac Units...	dc Units...
1-3 Modules including the base module	Unplug top power supply (slave)	Unplug the top two power supplies (slaves)	position jumper J12 according to Table 10-2	position jumper J12 according to Table 10-3
4-5 Modules including the base module	Plug in all four power supplies (master + 3 slaves)	Plug in all five power supplies (master + 4 slaves)		

Table 10-2. Passport 4400 jumper 12 strapping for ac units

Passport 4400 model and configuration	Jumper Positions (J-12)							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
5-slot standard, ac, 1 to 3 modules		X	X	X	X		X	X
5-slot standard, ac, 4 to 5 modules		X	X	X	X		X	
5-slot redundant, ac, 1 to 3 modules	X	X	X	X	X		X	X
5-slot redundant, ac, 4 to 5 modules	X	X	X	X	X			

Table 10-3. Passport 4400 jumper 12 strapping for dc units

Passport 4400 model and configuration	Jumper Positions (J-12)							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
5-slot standard, dc, 1 to 3 modules		X	X	X			X	X
5-slot standard, dc, 4 to 5 modules		X	X	X			X	
5-slot redundant, dc, 1 to 3 modules	X	X	X	X			X	X
5-slot redundant, dc, 4 to 5 modules	X	X	X	X				

Indicators 11

This section covers all the indicators and their meaning. The indicators can be seen through a small window at the front of the unit.

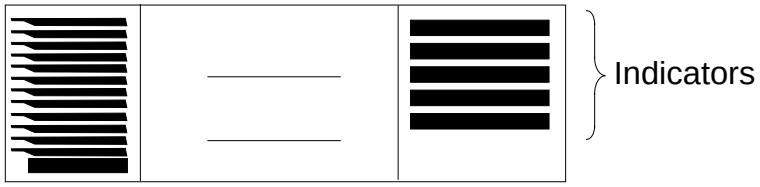


Figure 11-1. Location of Indicators on Passport 4400

Ethernet Base Module

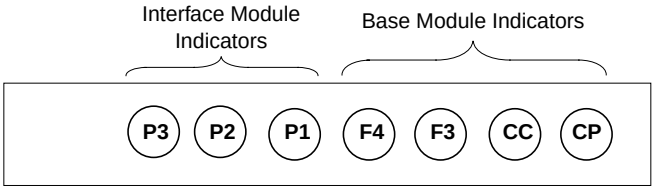


Figure 11-2. Ethernet Base Module Indicators

Table 11-1. Description of Ethernet Base Module Indicators

Indicator	Color	Meaning
CP	Green-flashing	Application is running
CC	Green	Reserved
F3	Green	Reserved
F4	Green	Reserved
P1	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved
P2	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved
P3	Amber Green Red	Physical port exists Frame Relay LMI is connected Reserved

Indicator P1 shows the status of Port 1, the Frame Relay DCE port.
Indicator P2 shows the status of Port 2, the MPANL port.
Indicator P3 shows the status of Port 3, the backup port.

T1/E1 Voice Module

There are 13 indicators associated with the T1/E1 Voice Module -- six for the Digital Voice channels, and seven for the Voice Module.

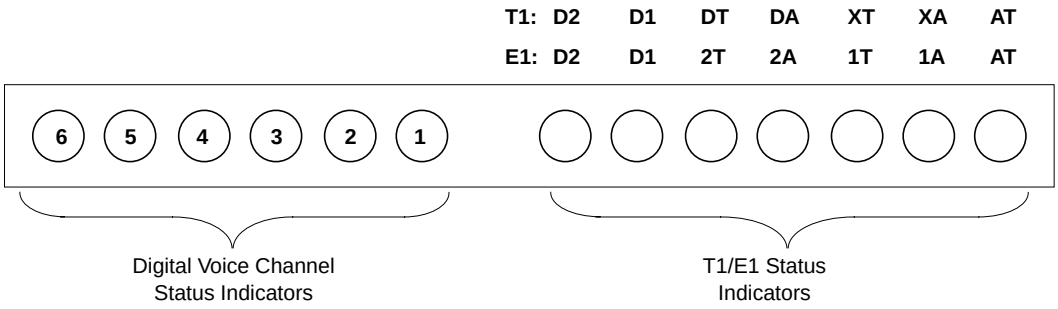


Figure 11-3. T1/E1 Access Module Indicators

Digital Voice Channel Status Indicators

Indicators 1 through 6 represent, respectively, the status of the digital voice channels B1 through B6, as follows:

Table 11-2. Digital Voice Channel Status Indicators

State	Status
Off	Digital Voice Module not installed or defective, or power is off
Green	Digital voice channel is connected, and active voice call is in progress
Flashing green	Test in progress
Quick-flashing green	Download in progress
Amber	Idle (both ends on-hook)
Flashing amber	Fax call in progress
Red	Waiting for code download
Flashing red	Busy
Quick-flashing red	Alarm/Test Failure

T1/E1 Status Indicators

Table 11-3. T1 Operational States

Indicator	Function	State	Status
AT	System Status	Off	Initialization mode – see Table 11-4.
		Green	Operational mode – see Table 11-4.
		Flashing green	Download active.
XA	DSX-1 interface alarm status	Off	Interface not active.
		Flashing red	Red alarm – sync loss (an out of frame condition) that lasts for more than 2.5 seconds.
		Flashing amber	Yellow alarm – received from the remote node that is currently in the red alarm state.
		Flashing green	Alarm Indication Signal (AIS) – Transmitted to the remote end when the T1 Access Module is in the internal digital loopback state. When received from the remote end, the T1 Access Module enters the AIS alarm state.
		Green	Interface operational.
XT	DSX-1 interface test status	Red	Test in progress – XA shows test status.
		Off	No test.
DA, DT, D1 and D2	Reserved for future use		

Table 11-4. T1/E1 Status Indicator Initialization States

T1/E1 indicator	D2	D1	DT/2T	DA/2A	XT/1T	XA/1A	AT
Power Off	Off	Off	Off	Off	Off	Off	Off
Reset	Green	Green	Red	Off	Red	Off	Green
RAM Test	Off	Off	Off	Red	Off	Off	Off
Boot Checksum Test	Off	Off	Off	Off	Red	Off	Off
Download Required	Off	Off	Red	Off	Off	Off	Off
Downloading Code	Off	Off	Off	Off	Off	Off	FlashGrn
TAM Initialization	Off	Off	Off	Off	Off	Red	Off

Table 11-5. E1 Operational States

Indicator	Function	State	Status
AT	System Status	Off	Initialization mode – see Table 11-4.
		Green	Operational mode – see Table 11-4.
		Flashing green	Download active.
1A	E1 Line 1 interface alarm status	Off	Interface not active.
		Flashing red	IFAS (Frame Alignment Signal) loss.
		Flashing amber	FAS distant alarm.
		Fast flashing green	TS16 AIS (Time Slot 16 Alarm Indication Signal).
		Green	Interface operational.
		Fast flashing red	CRC4 loss or MFAS loss.
		Flashing green	AIS (Alarm Indication Signal).
		Fast flashing amber	MFAS distant alarm.
1T	E1 Line 1 interface test status	Red	Line loopback test in progress – 1A shows test status.
		Flashing red	Channel loopback or pattern test in progress.
		Off	No test.
2A, 2T, D1 and D2	Reserved for future use		

Digital Voice Expansion Module

There are 13 indicators associated with the Digital Voice Expansion Module, as shown in the figure entitled “Digital Voice Expansion Module Indicators.”

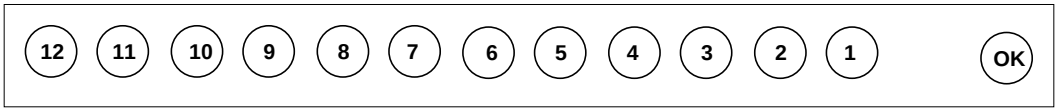


Figure 11-4. Digital Voice Expansion Module Indicators

Table 11-6. Description of Digital Voice Expansion Module Indicators

Indicator	State	Status
OK	Off	Digital Voice Expansion Module is not installed, off, or defective
	Red	Reset
	Green	Operational
1-12*	Off	Digital Voice Module is not installed or defective
	Green	Digital Voice Module is installed, and active voice call is in progress
	Flashing green	Test in progress
	Quick-flashing green	Download in progress
	Amber	Idle (both ends on-hook)
	Flashing amber	Fax call in progress
	Red	Waiting for code download
	Flashing red	Busy
	Quick flashing red	Alarm/Test Failure

*Indicators 1-12 represent voice channels C1-C12 when the Digital Voice Module is located in LIM C, channels D1-D12 when the Digital Voice Module is located in LIM D.

Analog Voice Module and Universal Analog Voice Module

There are a total of six indicators associated with each voice/fax channel of both the Analog Voice Module and the Universal Analog Voice Module. The following figure shows and describes the functions of the indicators during normal operation.

Note: During network code download, each red indicator is turned on and off sequentially for 1 second.

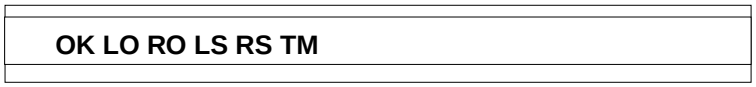


Figure 11-5. Analog Voice Module Indicators

Table 11-7. Description of Analog Voice Module Indicators

Indicator	State	Status
OK	On	Channel is in normal operating mode.
	Flashing	Channel is in fax mode.
	Off	Channel is inoperative.l
LO	On	E&M or FXS – channel is off-hook. FXO outgoing call – second dial tone is heard. FXO incoming call – call is answered.
	Flashing	Channel is in busyout state.
RO	On	Remote channel is attempting to contact local channel.
LS	On	Voice/fax traffic is flowing to remote end.
RS	On	Voice/fax traffic is obtained from remote end.
TM	Always off	

Cable Diagram Pin Assignments A

Diagrams are shown in this section for cables used with the Passport 4400. Use the cable matrix to determine which cable must be used for the desired interface.

Table A-1. Cable Selection for Ethernet Base Module and Data Modules

Port	Hardware	Type	CPC No.	Engineering code	Description	Page No.
manage-ment port	RJ45	RS232	A0668482	NTAU17AA	To DTE, M-M	A-4
Frame Relay ports	MD50	RS232/V.24	A0668483	NTAU18AA	WAN RS232 cable to DCE(DB25 male) (15 ft)	A-9
		V.35	A0668485	NTAU20AA	WAN V.35 cable to DCE (34-pin male) (15 ft)	A-7
		X.21	A0668492	NTAU26AA	WAN X.21 cable to DCE (DB15 male) (15 ft)	A-11
		V.36 Type 1	A0668487	NTAU22AA	WAN V.36 Type 1 cable to DCE (37-pin male) (15ft)	A-13
		V.36 Type 2	A0668490	NTAU24AA	WAN V.36 Type 2 cable to DCE (37-pin male) (15 ft)	A-15
		RS232/V.24	A0668484	NTAU19AA	WAN RS232 cable to DTE (DB25 female) (15 ft)	A-8
		V.35	A0668486	NTAU21AA	WAN V.35 cable to DTE (34-pin female) (15ft)	A-6
		X.21	A0668493	NTAU27AA	WAN X.21 cable to DTE (DB15 female) (15 ft)	A-10
		V.36 Type 1	A0668488	NTAU23AA	WAN V.36 Type 1 cable to DTE (37-pin female)(15 ft)	A-12
		V.36 Type 2	A0668491	NTAU25AA	WAN V.36 Type 2 cable to DTE (37-pin female)(15 ft)	A-14
Ethernet 10BaseT	RJ45, 10BaseT	V.35	A0669199	NTAU30AA	WAN V.35 cable to DCE (DB15 male) (15 ft)	A-5
56k CSU/DSU, T1 CSU/DSU	RJ45	straight	A0670357	NTML79AA	4400 CSU/DSU Cable (RJ-45 to RJ-45) (14 ft)	A-17
	RJ48	crossover	A0670698	NTMV09AA	4400 CSU/DSU Crossover Cable (RJ-45 to RJ-45) (14 ft)	A-19

Key: DTE = Data Terminal Equipment
DCE = Data Communications Equipment

Table A-2. Cable Selection for Digital Voice Modules

Port	Hardware	Type	CPC No.	Engineering code	Description	Page No.
DSX-1 for use with T1	RJ48	straight	A0670357	NTML79AA	modular straight cable	A-17
		crossover	A0670698	NTMV09AA	modular crossover cable	A-19
75 Ω line 1 for use with E1	coaxial	straight	n/a	n/a	straight coaxial cable	A-20
120 Ω line 1 for use with E1	DB9	straight	n/a	n/a	DB9 straight cable	A-16
		crossover	n/a	n/a	DB9 crossover cable	A-18
power supply board	power connector		A0674892	NTAU32AA	power harness for DVEM	

Table A-3. Cable Selection for Analog Voice Modules

Port	Hardware	Type	CPC No.	Engineering code	Description	Page No.
E&M	RJ1CX	straight	A0671273	NTMU88AA	straight Male-lugs	A-22
FXS/FXO	RJ11	straight	A0670512	NTMR38AA	straight Male-Male	A-21

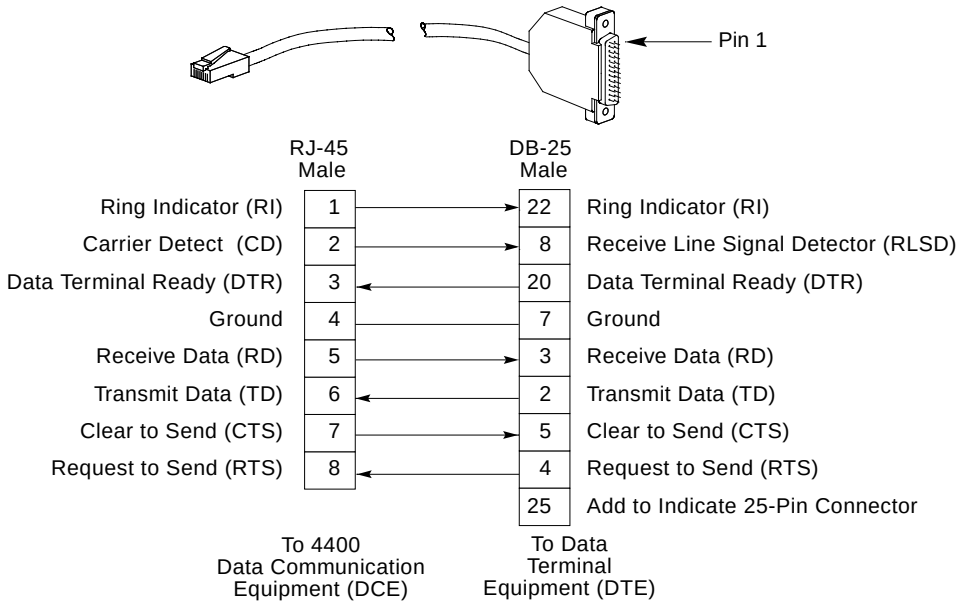

Pin 1
RJ-45
Male
DB-25
Male
Ring Indicator (RI) 1 22 Ring Indicator (RI)
Carrier Detect (CD) 2 8 Receive Line Signal Detector (RLSD)
Data Terminal Ready (DTR) 3 20 Data Terminal Ready (DTR)
Ground 4 7 Ground
Receive Data (RD) 5 3 Receive Data (RD)
Transmit Data (TD) 6 2 Transmit Data (TD)
Clear to Send (CTS) 7 5 Clear to Send (CTS)
Request to Send (RTS) 8 4 Request to Send (RTS)
25 Add to Indicate 25-Pin Connector
To 4400
Data Communication
Equipment (DCE)
To Data
Terminal
Equipment (DTE)

Figure A-1. Cable Model No. NTAU17AA - Console to DTE Equipment

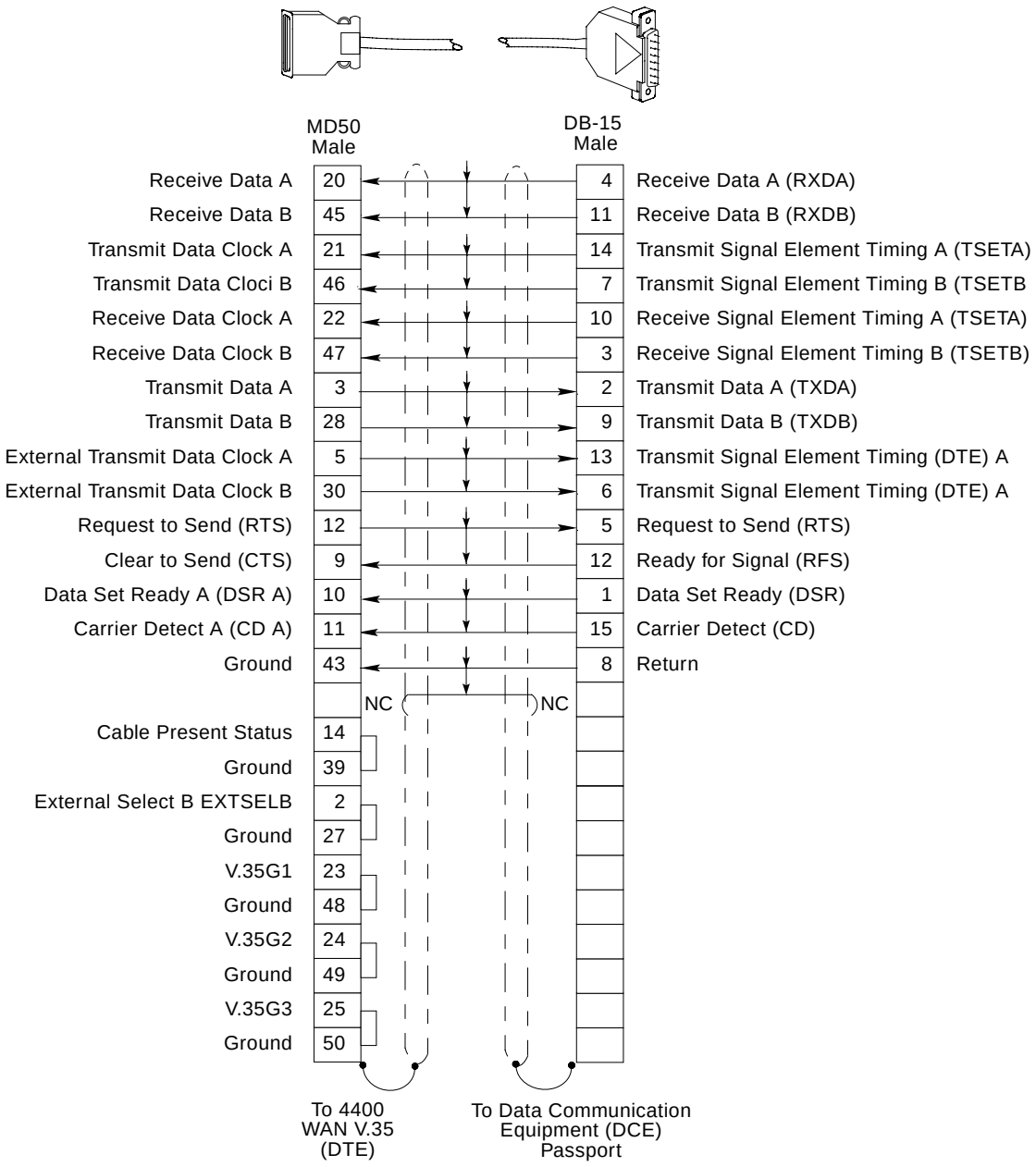

MD50
Male
DB-15
Male
Receive Data A 20 4 Receive Data A (RXDA)
Receive Data B 45 11 Receive Data B (RXDB)
Transmit Data Clock A 21 14 Transmit Signal Element Timing A (TSETA)
Transmit Data Cloci B 46 7 Transmit Signal Element Timing B (TSETB
Receive Data Clock A 22 10 Receive Signal Element Timing A (TSETA)
Receive Data Clock B 47 3 Receive Signal Element Timing B (TSETB)
Transmit Data A 3 2 Transmit Data A (TXDA)
Transmit Data B 28 9 Transmit Data B (TXDB)
External Transmit Data Clock A 5 13 Transmit Signal Element Timing (DTE) A
External Transmit Data Clock B 30 6 Transmit Signal Element Timing (DTE) A
Request to Send (RTS) 12 5 Request to Send (RTS)
Clear to Send (CTS) 9 12 Ready for Signal (RFS)
Data Set Ready A (DSR A) 10 1 Data Set Ready (DSR)
Carrier Detect A (CD A) 11 15 Carrier Detect (CD)
Ground 43 8 Return
NC
NC
Cable Present Status 14
Ground 39
External Select B EXTSELB 2
Ground 27
V.35G1 23
Ground 48
V.35G2 24
Ground 49
V.35G3 25
Ground 50
To 4400
WAN V.35
(DTE)
To Data Communication
Equipment (DCE)
Passport

Figure A-2. Cable Model No. NTAU30AA - 4400 to Passport DCE (V.35) Direct Connect to Passport Switch Fanout Panel

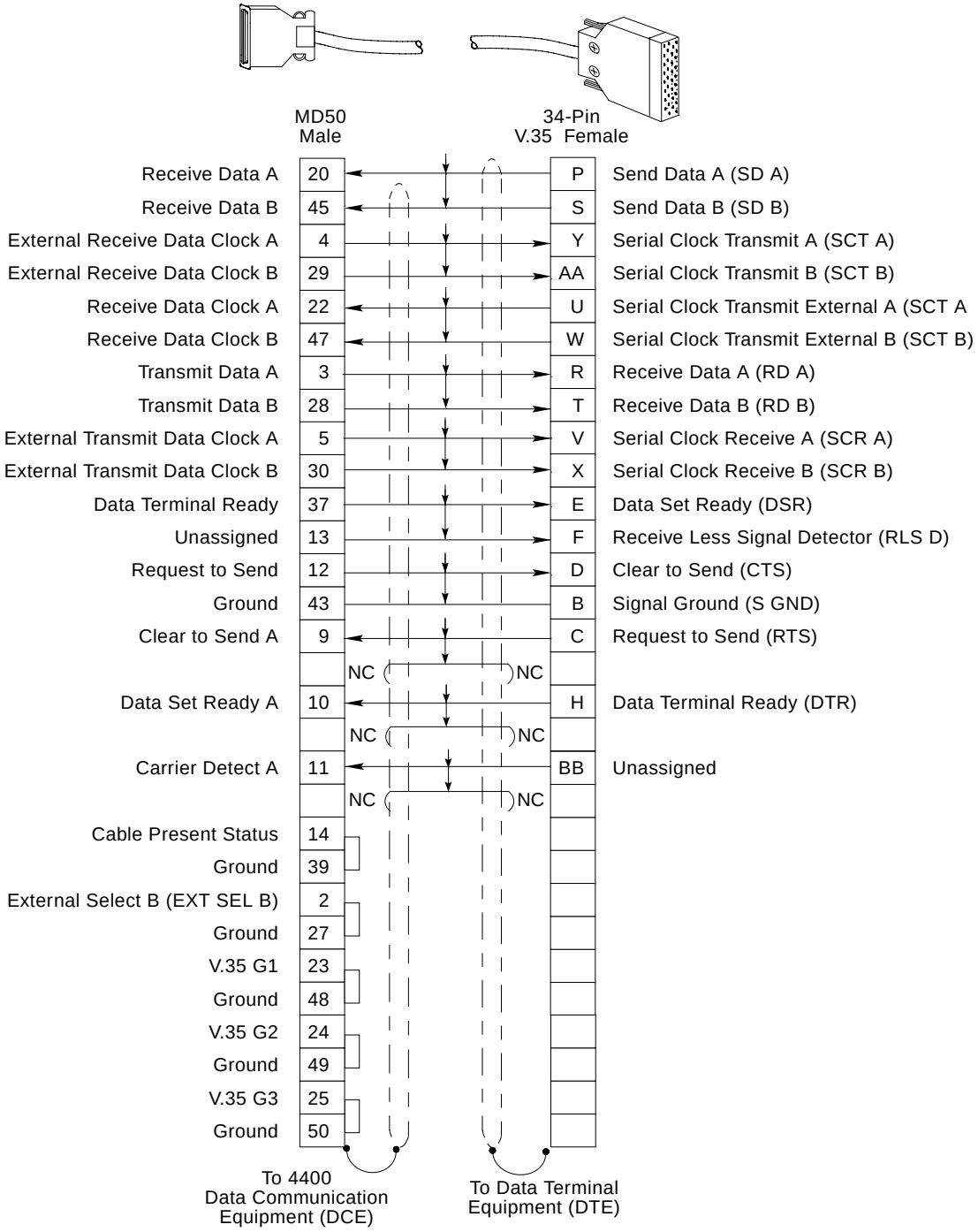

MD50
Male
34-Pin
V.35 Female
Receive Data A 20 P Send Data A (SD A)
Receive Data B 45 S Send Data B (SD B)
External Receive Data Clock A 4 Y Serial Clock Transmit A (SCT A)
External Receive Data Clock B 29 AA Serial Clock Transmit B (SCT B)
Receive Data Clock A 22 U Serial Clock Transmit External A (SCT A
Receive Data Clock B 47 W Serial Clock Transmit External B (SCT B)
Transmit Data A 3 R Receive Data A (RD A)
Transmit Data B 28 T Receive Data B (RD B)
External Transmit Data Clock A 5 V Serial Clock Receive A (SCR A)
External Transmit Data Clock B 30 X Serial Clock Receive B (SCR B)
Data Terminal Ready 37 E Data Set Ready (DSR)
Unassigned 13 F Receive Less Signal Detector (RLS D)
Request to Send 12 D Clear to Send (CTS)
Ground 43 B Signal Ground (S GND)
Clear to Send A 9 C Request to Send (RTS)
NC NC
Data Set Ready A 10 H Data Terminal Ready (DTR)
NC NC
Carrier Detect A 11 BB Unassigned
NC NC
Cable Present Status 14
Ground 39
External Select B (EXT SEL B) 2
Ground 27
V.35 G1 23
Ground 48
V.35 G2 24
Ground 49
V.35 G3 25
Ground 50
To 4400
Data Communication
Equipment (DCE)
To Data Terminal
Equipment (DTE)

Figure A-3. Cable Model No. NTAU21AA - 4400 to DTE Equipment

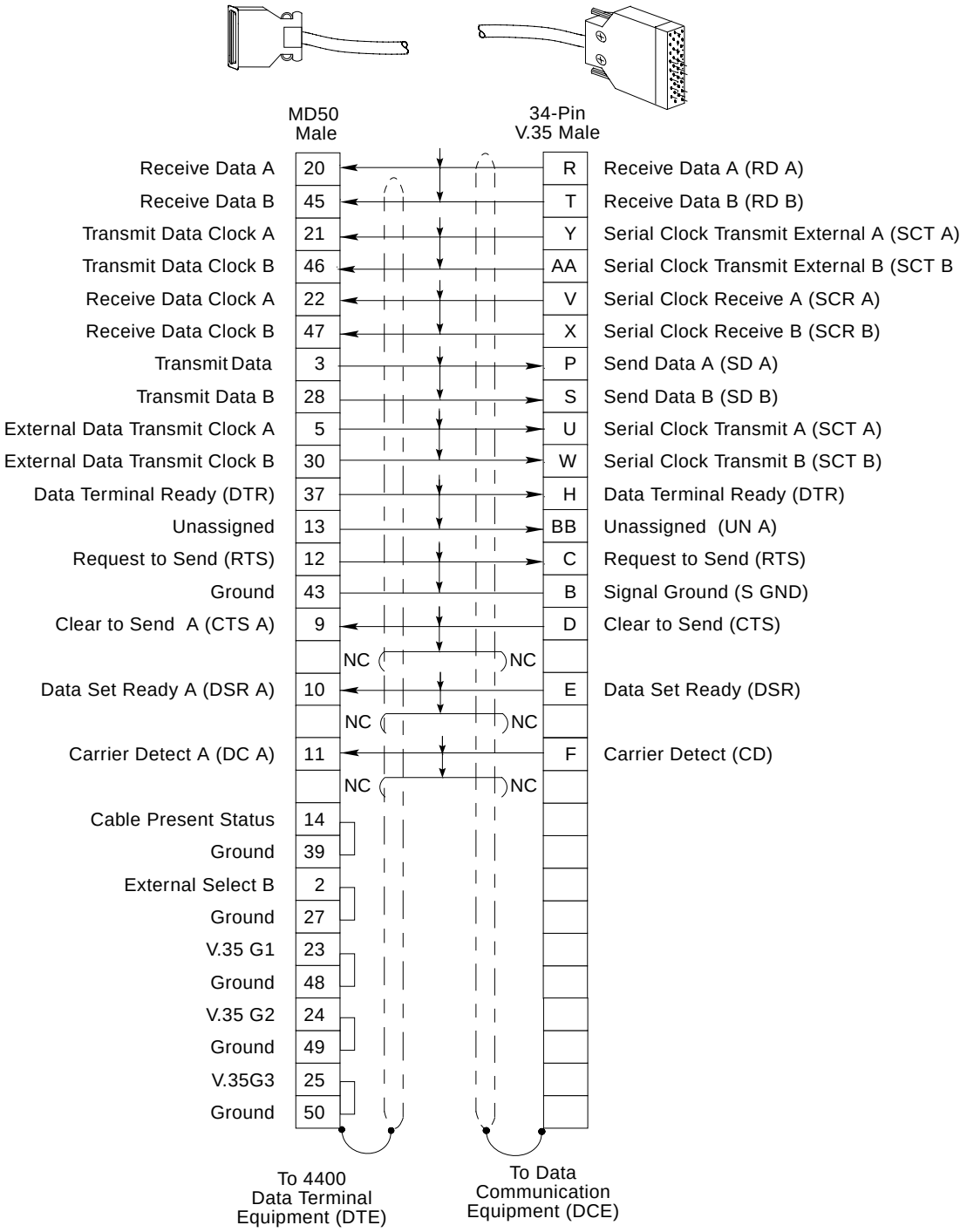


Figure A-4. Cable Model No. NTAU20AA - 4400 to DCE Equipment

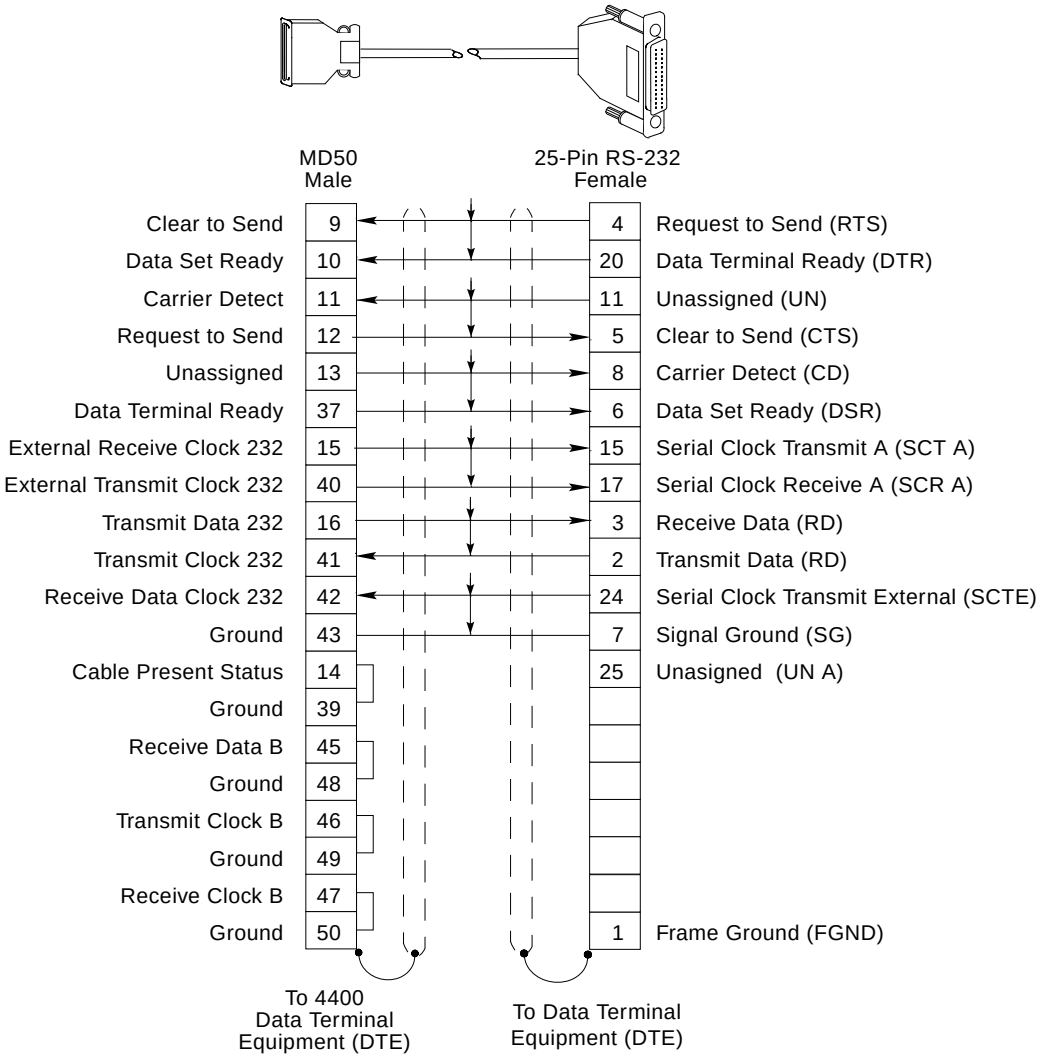

MD50
Male
25-Pin RS-232
Female
Clear to Send 9 4 Request to Send (RTS)
Data Set Ready 10 20 Data Terminal Ready (DTR)
Carrier Detect 11 11 Unassigned (UN)
Request to Send 12 5 Clear to Send (CTS)
Unassigned 13 8 Carrier Detect (CD)
Data Terminal Ready 37 6 Data Set Ready (DSR)
External Receive Clock 232 15 15 Serial Clock Transmit A (SCT A)
External Transmit Clock 232 40 17 Serial Clock Receive A (SCR A)
Transmit Data 232 16 3 Receive Data (RD)
Transmit Clock 232 41 2 Transmit Data (RD)
Receive Data Clock 232 42 24 Serial Clock Transmit External (SCTE)
Ground 43 7 Signal Ground (SG)
Cable Present Status 14 25 Unasigned (UN A)
Ground 39
Receive Data B 45
Ground 48
Transmit Clock B 46
Ground 49
Receive Clock B 47
Ground 50 1 Frame Ground (FGND)
To 4400
Data Terminal
Equipment (DTE)
To Data Terminal
Equipment (DTE)

Figure A-5. Cable Model No. NTAU19AA - 4400 to DTE Equipment

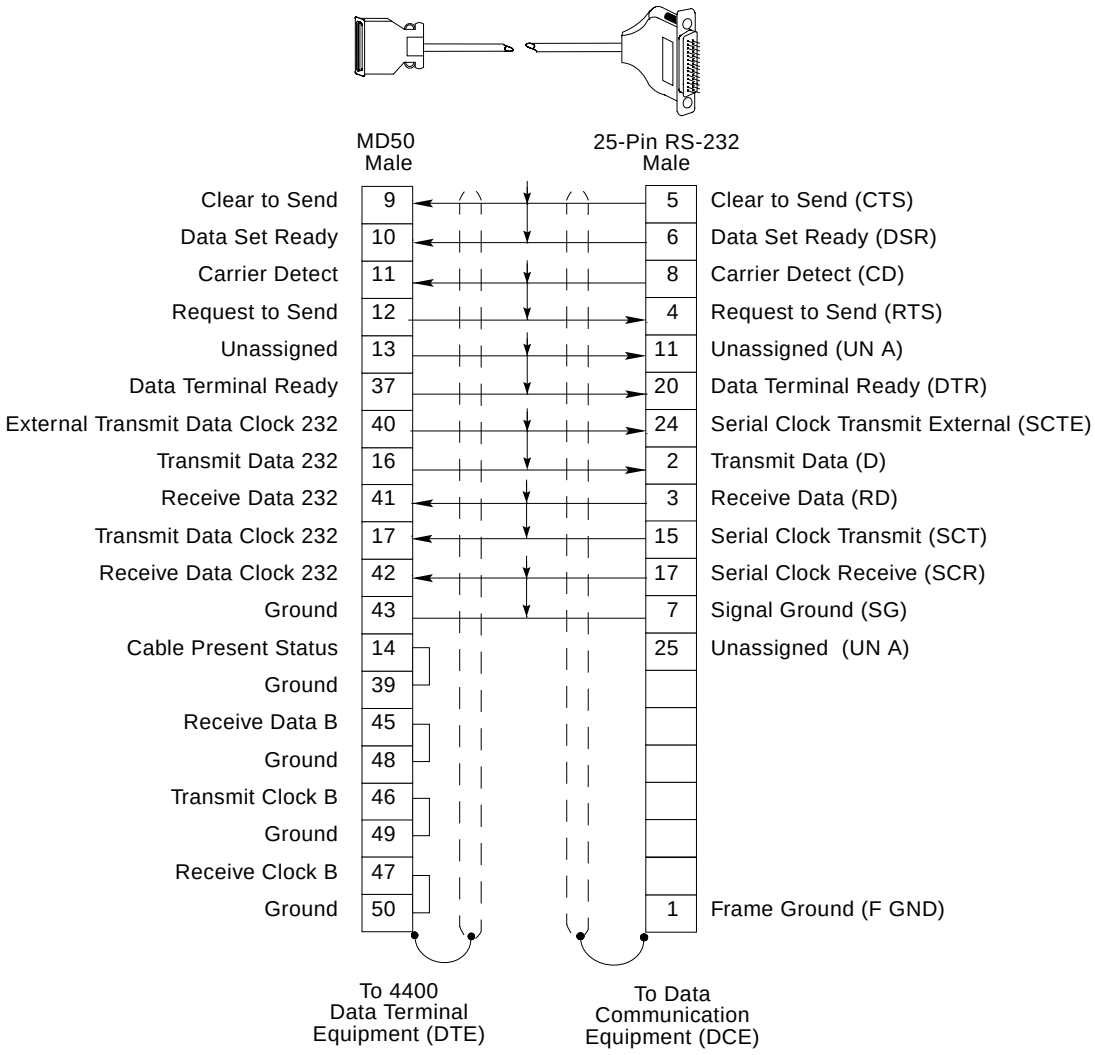

MD50
Male
25-Pin RS-232
Male
Clear to Send 9 5 Clear to Send (CTS)
Data Set Ready 10 6 Data Set Ready (DSR)
Carrier Detect 11 8 Carrier Detect (CD)
Request to Send 12 4 Request to Send (RTS)
Unassigned 13 11 Unassigned (UN A)
Data Terminal Ready 37 20 Data Terminal Ready (DTR)
External Transmit Data Clock 232 40 24 Serial Clock Transmit External (SCTE)
Transmit Data 232 16 2 Transmit Data (D)
Receive Data 232 41 3 Receive Data (RD)
Transmit Data Clock 232 17 15 Serial Clock Transmit (SCT)
Receive Data Clock 232 42 17 Serial Clock Receive (SCR)
Ground 43 7 Signal Ground (SG)
Cable Present Status 14 25 Unassigned (UN A)
Ground 39
Receive Data B 45
Ground 48
Transmit Clock B 46
Ground 49
Receive Clock B 47
Ground 50 1 Frame Ground (F GND)
To 4400
Data Terminal
Equipment (DTE)
To Data
Communication
Equipment (DCE)

Figure A-6. Cable Model No. NTAU18AA - 4400 to DCE Equipment

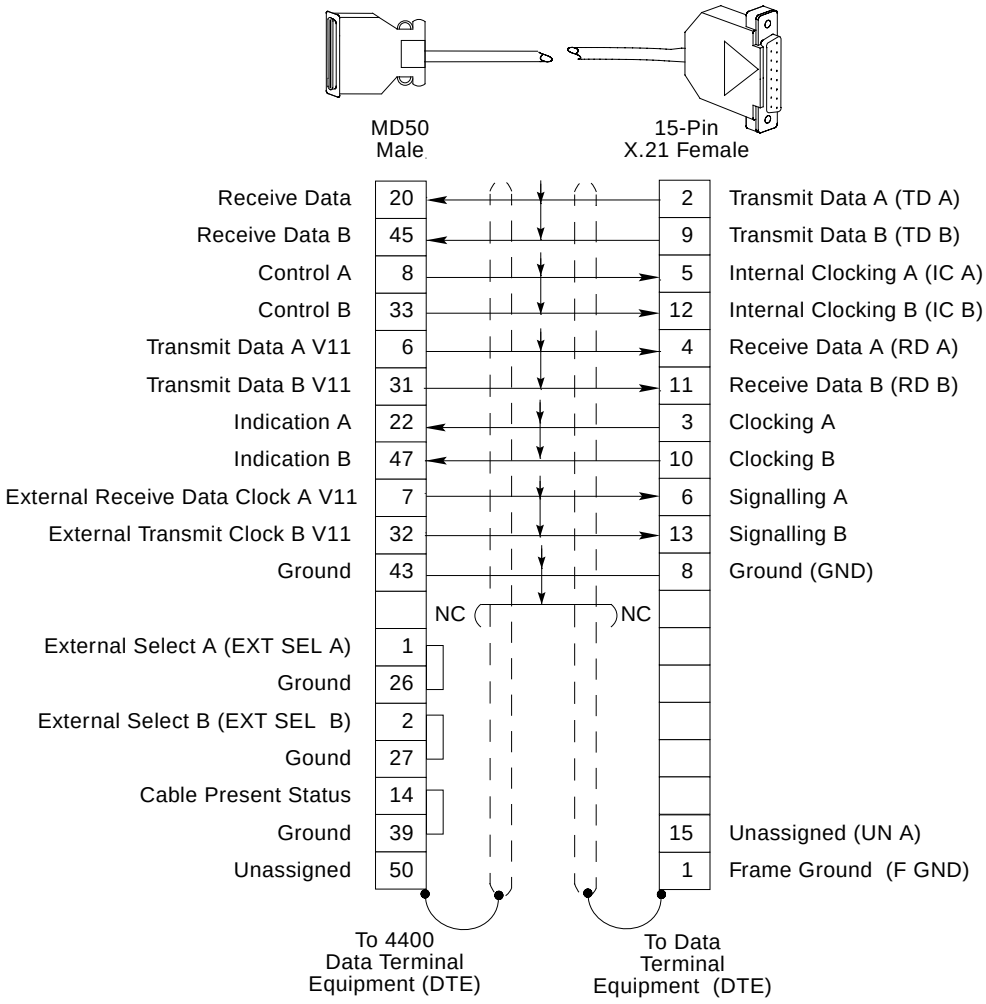

MD50
Male
15-Pin
X.21 Female
Receive Data 20 2 Transmit Data A (TD A)
Receive Data B 45 9 Transmit Data B (TD B)
Control A 8 5 Internal Clocking A (IC A)
Control B 33 12 Internal Clocking B (IC B)
Transmit Data A V11 6 4 Receive Data A (RD A)
Transmit Data B V11 31 11 Receive Data B (RD B)
Indication A 22 3 Clocking A
Indication B 47 10 Clocking B
External Receive Data Clock A V11 7 6 Signalling A
External Transmit Clock B V11 32 13 Signalling B
Ground 43 8 Ground (GND)
NC
NC
External Select A (EXT SEL A) 1
Ground 26
External Select B (EXT SEL B) 2
Gound 27
Cable Present Status 14
Ground 39 15 Unassigned (UN A)
Unassigned 50 1 Frame Ground (F GND)
To 4400
Data Terminal
Equipment (DTE)
To Data
Terminal
Equipment (DTE)

Figure A-7. Cable Model No. NTAU27AA - 4400 to DTE

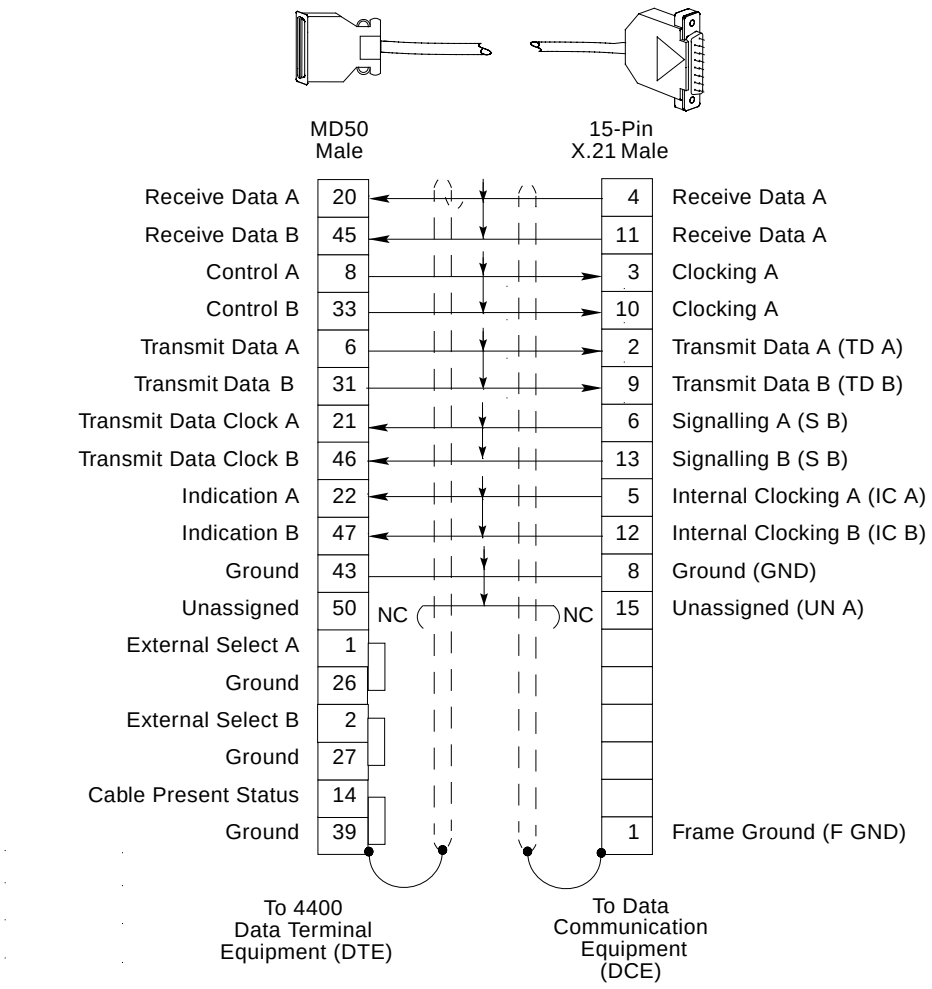
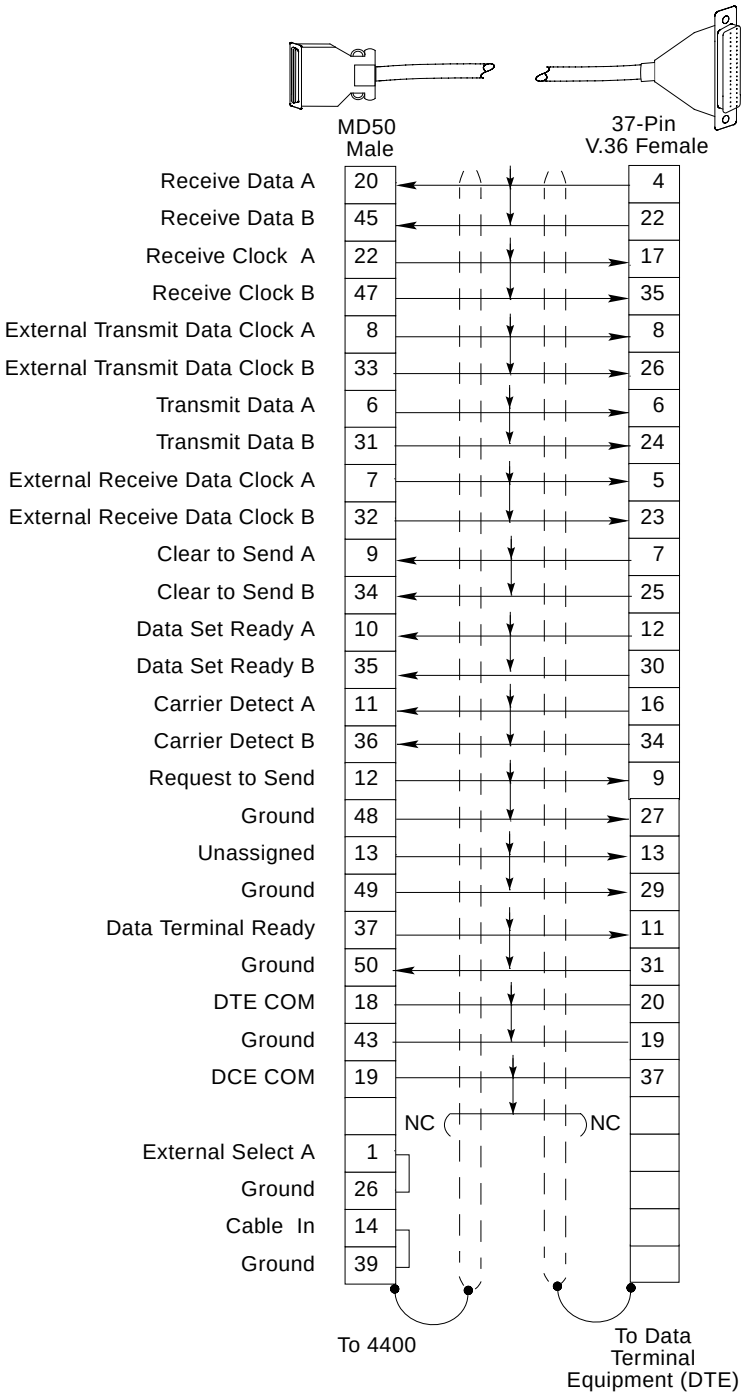
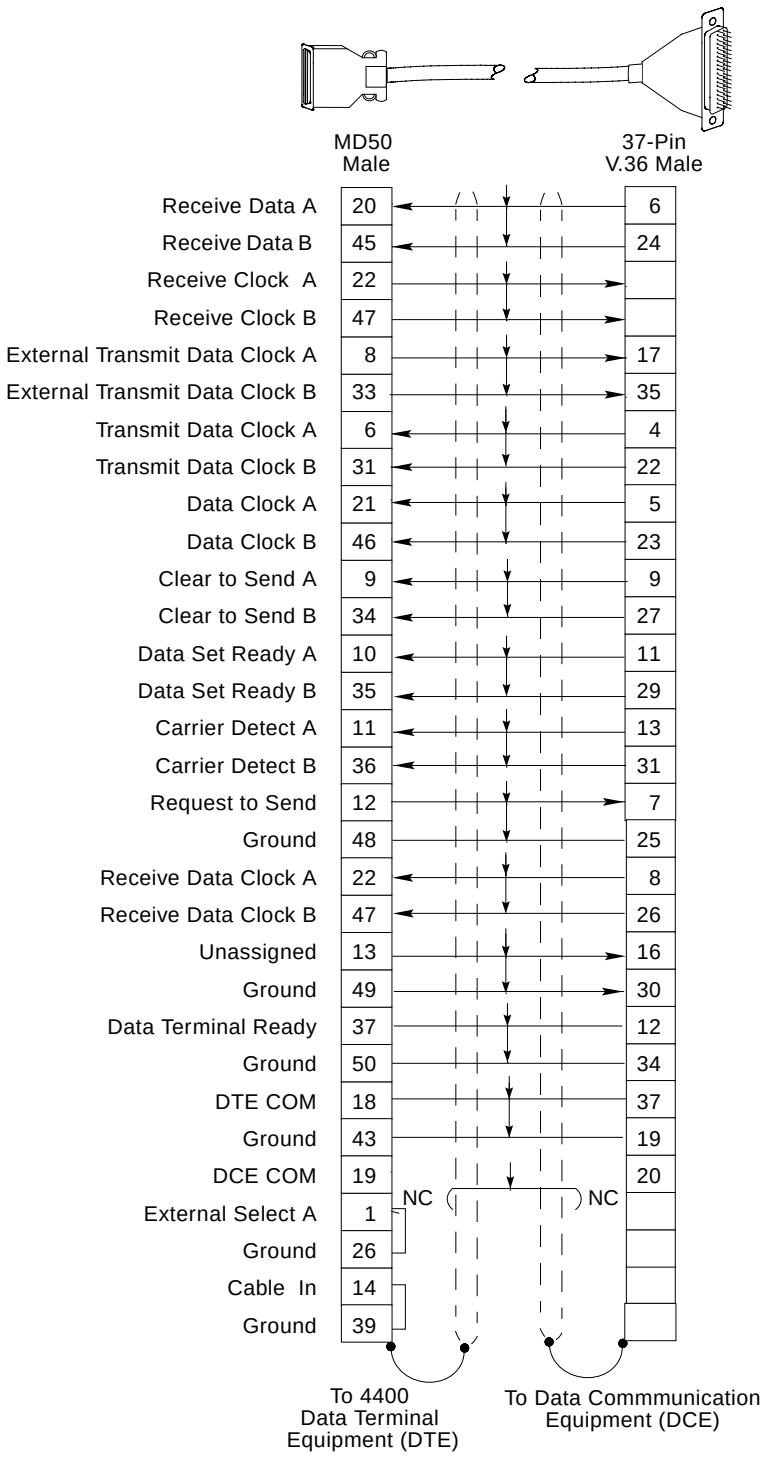

MD50
Male
15-Pin
X.21 Male
Receive Data A 20 4 Receive Data A
Receive Data B 45 11 Receive Data A
Control A 8 3 Clocking A
Control B 33 10 Clocking A
Transmit Data A 6 2 Transmit Data A (TD A)
Transmit Data B 31 9 Transmit Data B (TD B)
Transmit Data Clock A 21 6 Signalling A (S B)
Transmit Data Clock B 46 13 Signalling B (S B)
Indication A 22 5 Internal Clocking A (IC A)
Indication B 47 12 Internal Clocking B (IC B)
Ground 43 8 Ground (GND)
Unassigned 50 NC NC 15 Unassigned (UN A)
External Select A 1
Ground 26
External Select B 2
Ground 27
Cable Present Status 14
Ground 39 1 Frame Ground (F GND)
To 4400
Data Terminal
Equipment (DTE)
To Data
Communication
Equipment
(DCE)

Figure A-8. Cable Model No. NTAU26AA - 4400 to DCE



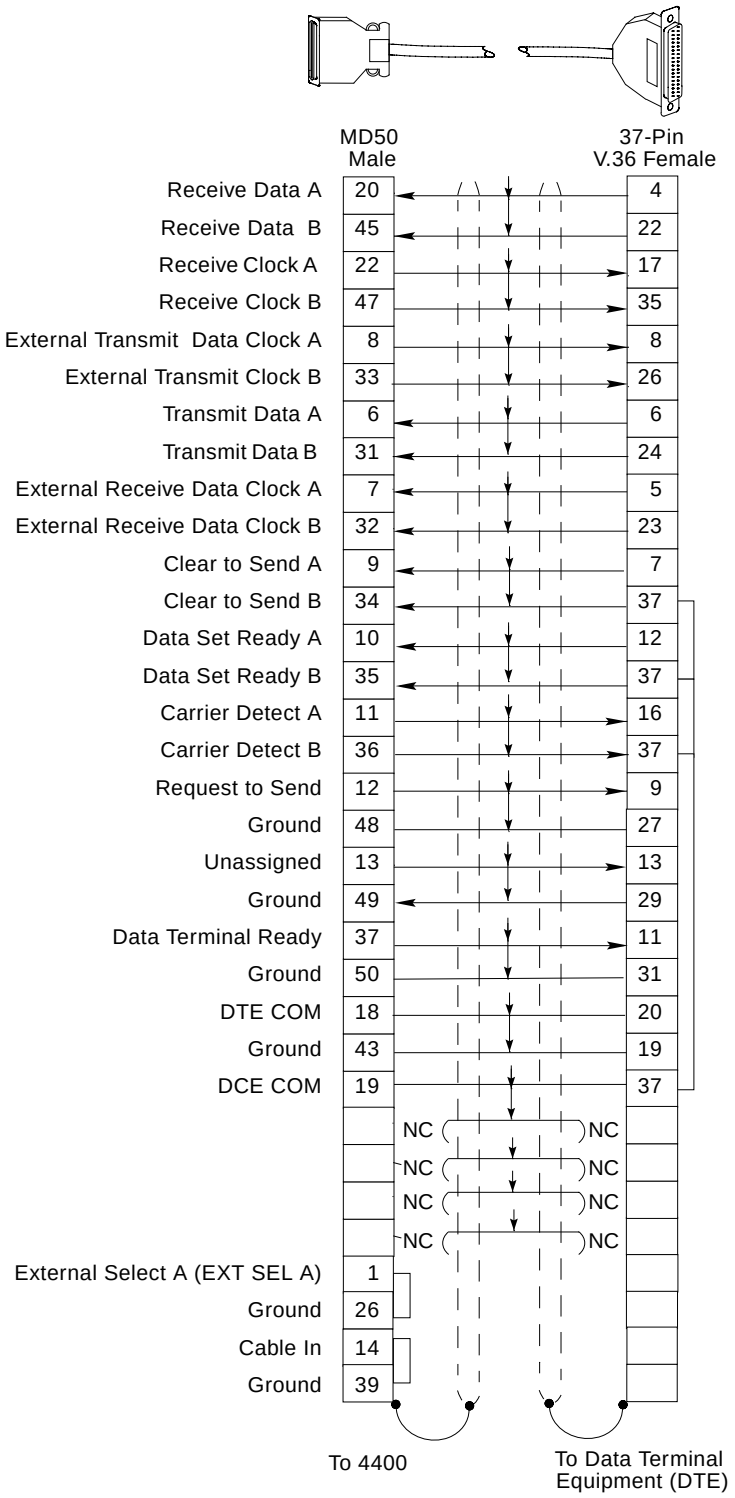
Type 1 Cables: Receivers shall have both input terminals connected to individual terminals at the load interchange point, independent of all other receivers.

Figure A-9. Cable Model No. NTAU23AA - 4400 to DTE


MD50
Male
37-Pin
V.36 Male
Receive Data A 20 6
Receive Data B 45 24
Receive Clock A 22
Receive Clock B 47
External Transmit Data Clock A 8 17
External Transmit Data Clock B 33 35
Transmit Data Clock A 6 4
Transmit Data Clock B 31 22
Data Clock A 21 5
Data Clock B 46 23
Clear to Send A 9 9
Clear to Send B 34 27
Data Set Ready A 10 11
Data Set Ready B 35 29
Carrier Detect A 11 13
Carrier Detect B 36 31
Request to Send 12 7
Ground 48 25
Receive Data Clock A 22 8
Receive Data Clock B 47 26
Unassigned 13 16
Ground 49 30
Data Terminal Ready 37 12
Ground 50 34
DTE COM 18 37
Ground 43 19
DCE COM 19 20
External Select A 1 NC NC
Ground 26
Cable In 14
Ground 39
To 4400
Data Terminal
Equipment (DTE)
To Data Commmunication
Equipment (DCE)

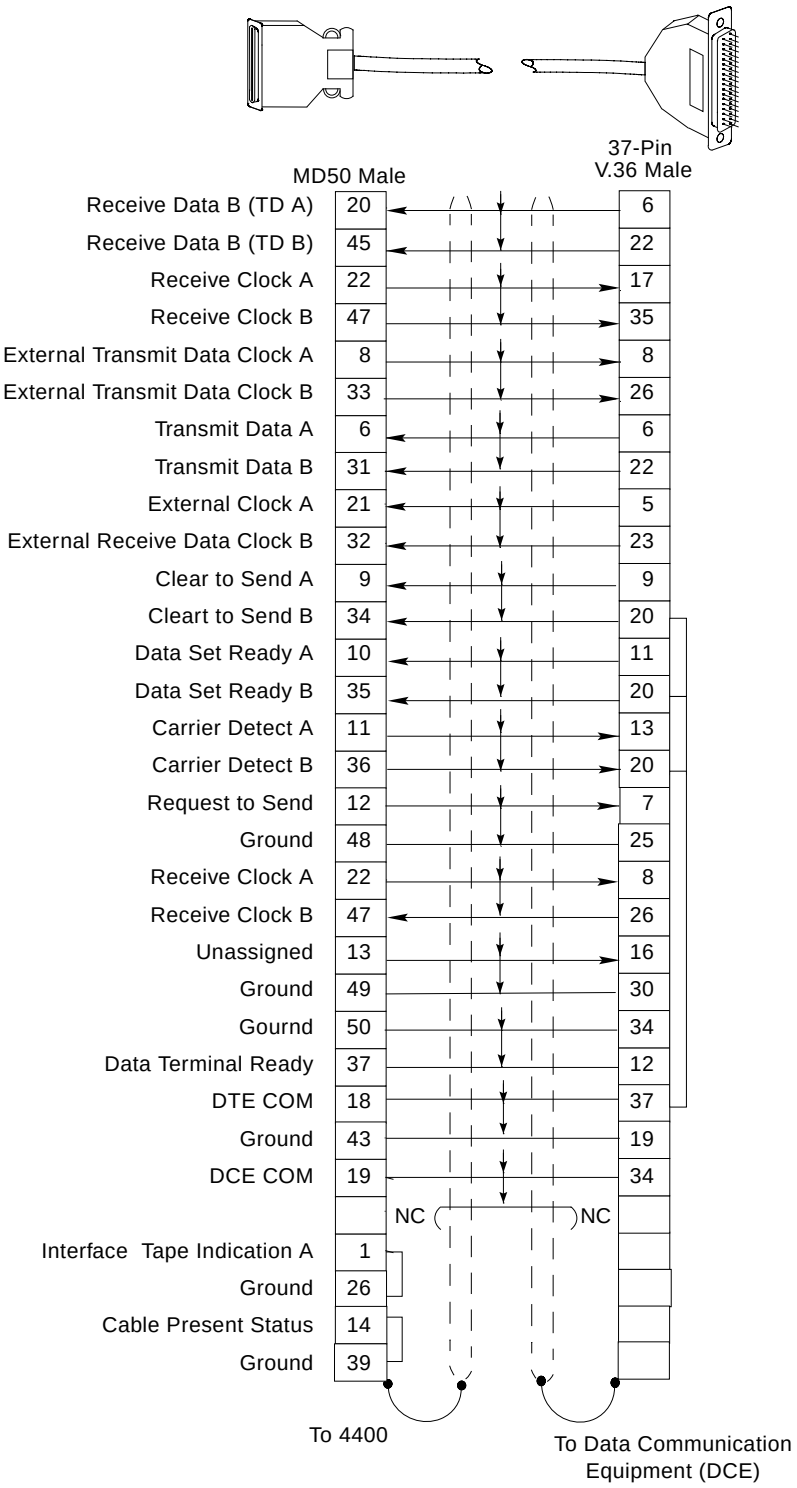
Type 1 Cables: Receivers shall have both input terminals connected to individual terminals at the load interchange point, independent of all other receivers.

Figure A-10. Cable Model No. NTAU22AA - 4400 to DCE


MD50
Male
37-Pin
V.36 Female
Receive Data A 20 4
Receive Data B 45 22
Receive Clock A 22 17
Receive Clock B 47 35
External Transmit Data Clock A 8 8
External Transmit Clock B 33 26
Transmit Data A 6 6
Transmit Data B 31 24
External Receive Data Clock A 7 5
External Receive Data Clock B 32 23
Clear to Send A 9 7
Clear to Send B 34 37
Data Set Ready A 10 12
Data Set Ready B 35 37
Carrier Detect A 11 16
Carrier Detect B 36 37
Request to Send 12 9
Ground 48 27
Unassigned 13 13
Ground 49 29
Data Terminal Ready 37 11
Ground 50 31
DTE COM 18 20
Ground 43 19
DCE COM 19 37
NC NC
NC NC
NC NC
NC NC
External Select A (EXT SEL A) 1
Ground 26
Cable In 14
Ground 39
To 4400
To Data Terminal
Equipment (DTE)

Type 2 cables: Receivers shall have one terminal connection for each input terminal at the load interchange points.

Figure A-11. Cable Model No. NTAU25AA - 4400 to DTE


37-Pin
V.36 Male
MD50 Male
Receive Data B (TD A) 20 6
Receive Data B (TD B) 45 22
Receive Clock A 22 17
Receive Clock B 47 35
External Transmit Data Clock A 8 8
External Transmit Data Clock B 33 26
Transmit Data A 6 6
Transmit Data B 31 22
External Clock A 21 5
External Receive Data Clock B 32 23
Clear to Send A 9 9
Cleart to Send B 34 20
Data Set Ready A 10 11
Data Set Ready B 35 20
Carrier Detect A 11 13
Carrier Detect B 36 20
Request to Send 12 7
Ground 48 25
Receive Clock A 22 8
Receive Clock B 47 26
Unassigned 13 16
Ground 49 30
Gournd 50 34
Data Terminal Ready 37 12
DTE COM 18 37
Ground 43 19
DCE COM 19 34
NC
NC
Interface Tape Indication A 1
Ground 26
Cable Present Status 14
Ground 39
To 4400
To Data Communication
Equipment (DCE)

Type 2 cables: Receivers shall have one terminal connection for each input terminal at the load interchange point.

Figure A-12. Cable Model No. NTAU24AA - 4400 to DCE

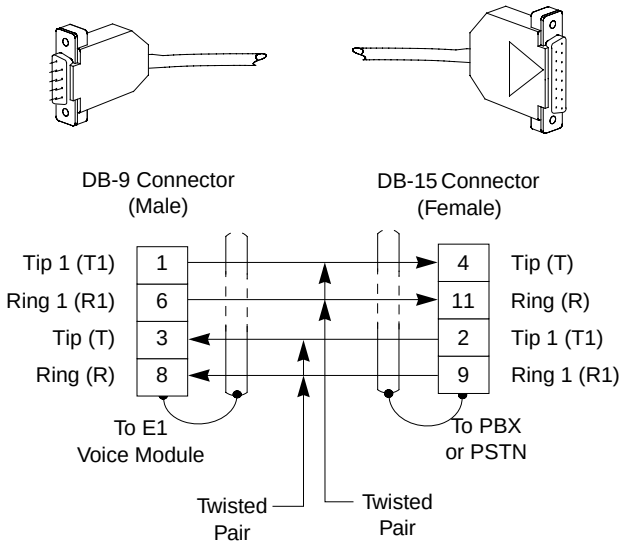


Figure A-13. 120 ohm Straight Cable

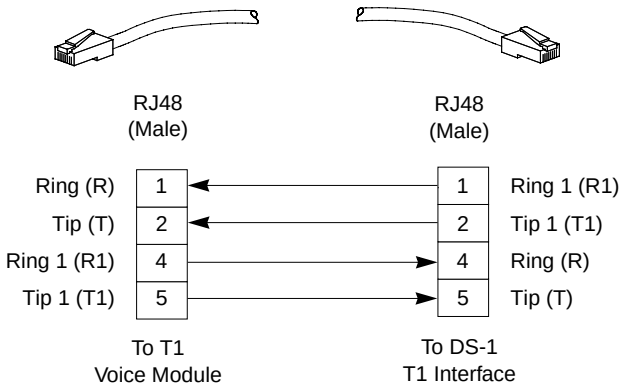


Figure A-14. Cable Model No. NTML79AA -- Modular Straight Cable

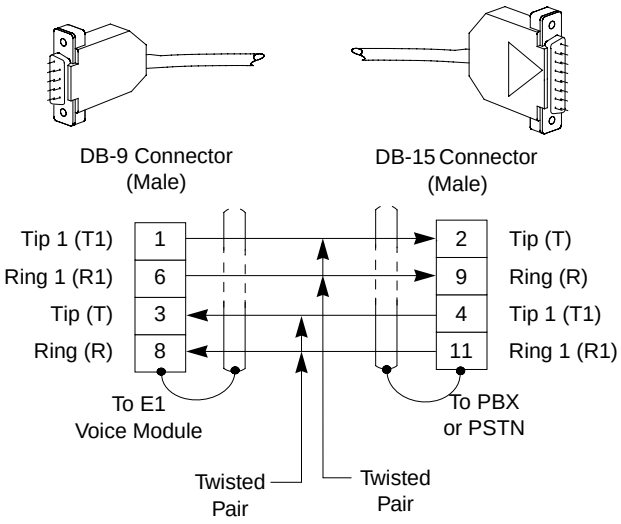


Figure A-15. 120 ohm Crossover Cable

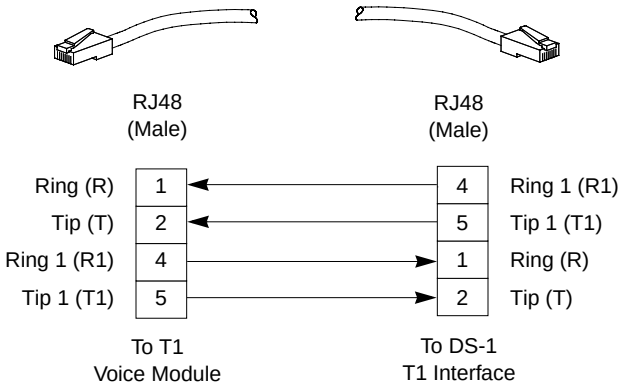


Figure A-16. Cable Model No. NTMV09AA -- Modular Crossover Cable

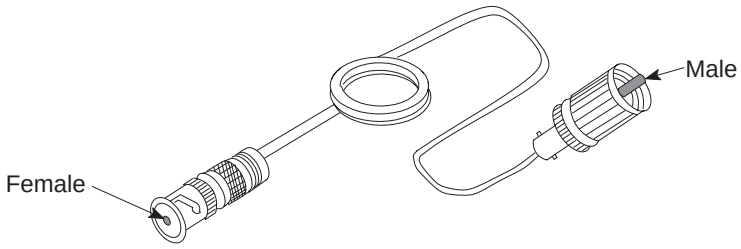


Figure A-17. Coaxial Cable

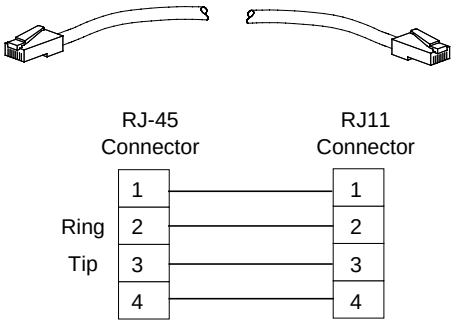


Figure A-18. Cable Model No. NTMR38AA -- Modular Straight Cable

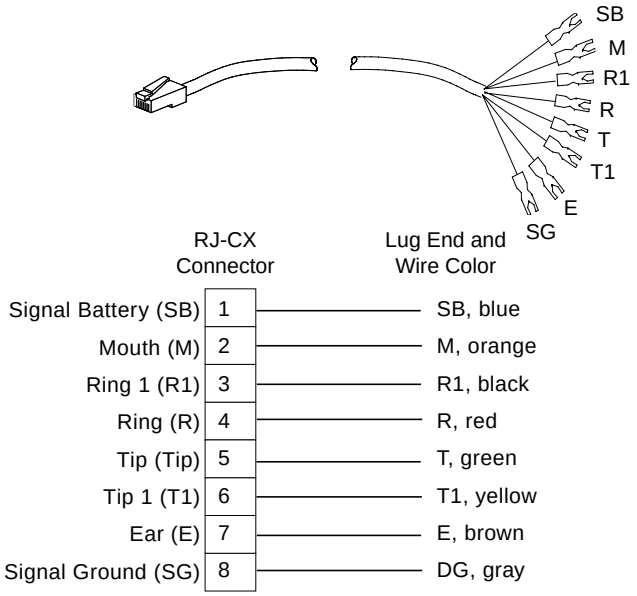


Figure A-19. Cable Model No. NTMU88AA -- Modular Cable to Lugs

Index

56kbps CSU/DSU Interface Module 5-4
  agency compliances 1-11
  pin assignments 5-4

A

Affidavit for digital services 1-9
Agencies
  BABT iii, iv
  CSA iv
  FCC ii, iv
  TUV iii
  UL iii
Agency compliances
  56kbps CSU/DSU Interface Module 1-11
  Analog Voice Module 1-17
  E1 Voice Module 1-16
  High-speed Data Module 1-14
  ISDN S/T Interface Module 1-13
  ISDN U Interface Module 1-13
  Legacy Data Expansion Module 1-14
  Legacy Data Module 1-14
  Passport 4400 1-6
  T1 Voice Module 1-15
  Universal Analog Voice Module 1-17
  WAN Serial Interface Module 1-11
Analog Voice Module (AVM) 1-4, 8-13
  agency compliances 1-17
  connecting 4-7
  indicators 11-6
  pin assignments 4-7
  straps 8-14
  user's responsibility 1-18

B

Back panel
  blanks 6-5
  grounding clips 6-4

C

Canadian Requirements iv
CE Conformance ii
Connectors
  stacking 6-4

D

Digital Voice Expansion Module (DVEM) 9-6
  indicators 11-5
  power harness 9-7, 10-3
Digital Voice Module (DVM) 9-8
  installing 9-8
DIP switches
  expansion modules 6-3

E

E&M interface module 8-11
  straps 8-11
E1 Voice Module (EVM) 1-4, 9-1
  agency compliances 1-16
  connecting 4-6
  indicators 11-2
  operational states 11-4
  pin assignments 4-6
  straps 9-4
  user's responsibility 1-16
Environmental specifications 2-2
Ethernet Base Module (EBM) 1-3
  components 5-1
  connecting 3-2
  indicators 11-1
  interface modules

installing 5-2
ports
diagram 3-1
Ethernet access ports 3-5
pin assignments 3-5
Frame Relay DCE 3-2
pin assignments 3-3
interface modules
pin assignments 3-6
management port 3-4
pin assignments 3-4
Expansion modules
DIP switches 6-3
installing 6-6

F

FCC Requirements iv
FXO interface module 8-5
straps 8-7
France 8-8
Germany and Switzerland 8-10
Spain 8-9
FXS interface module 8-5
straps 8-6

G

Grounding clips 6-4

H

High-speed Data Module (HDM) 1-3, 7-1
agency compliances 1-14
connecting 4-1
pin assignments 4-2

I

Indicators
Analog Voice Module 11-6
Base Module
status 2-7
Digital Voice Expansion Module 11-5
Ethernet Base Module 11-1
T1/E1 Voice Module 11-2
Universal Analog Voice Module 11-6
Installation
space requirements 2-1, 2-2
Installing expansion modules 6-6
Interface Modules
installing 5-2
ISDN Interface Module 5-6
agency compliances 1-13
S/T interface
pin assignments 5-7
straps 5-7
U interface
pin assignments 5-6

L

Legacy Data Expansion Module (LEM) 1-4, 7-3
agency compliances 1-14
connecting 4-3
pin assignments 4-2
Legacy Data Module (LDM) 1-4, 7-3
agency compliances 1-14
connecting 4-3
pin assignments 4-2, 4-3
Logical Interface Module (LIM)
settings 6-2
Logical interface module (LIM)
DIP switches 6-3
Low-speed Data Services Modules 7-3

N

Notice of electromagnetic compatibility (EMC) 6-1

O

Operating environment 1-6
Overview of Passport 4400 1-2

P

Passport 4400
agency compliances 1-6
environmental specifications 2-2
operating environment 1-6
overview 1-2
physical dimensions 1-5
space requirements 2-1
unpacking 2-3
Pin assignments
56kbps CSU/DSU Serial Interface 5-4
Analog Voice Module 4-7

E1 Voice Module 4-6
High-speed Data Module 4-2
ISDN S/T Interface Module 5-7
ISDN U Interface Module 5-6
Legacy Data Expansion Module 4-2
Legacy Data Module 4-2, 4-3
T1 CSU/DSU Serial Interface 5-5
T1 Voice Module 4-5
Universal Analog Voice Module 4-9
Power
ac
connecting 2-6
cord length 2-1
power cord 2-5
configuring 10-5
dc
connecting 2-6
power supply 10-1
power harness for DVEM 9-7, 10-3
redundant power supply 10-4

R

Reset
reset switch 2-8

S

Safety iii
Safety information 1-4, 6-1
Space requirements 2-1
Spacers 6-5
Specifications 1-5
agency compliances 1-6
operating environment 1-6
physical 1-5
Stacking connectors 6-4
Straps
Analog Voice Module 8-14
E&M interface module 8-11
E1 Voice Module 9-4
FXO interface module 8-7
country-specific 8-8
FXS interface module 8-6
ISDN S/T Interface Module 5-7

T

T1 CSU/DSU Interface Module 5-5
pin assignments 5-5
user's responsibility 1-12
T1 Voice Module (TVM) 1-4, 9-1
agency compliances 1-15
connecting 4-5
indicators 11-2
operational states 11-3
pin assignments 4-5

U

United Kingdom Requirements iv
Universal Analog Voice Module (UAVM) 1-4, 8-1
agency compliances 1-17
connecting 4-9
E&M interface module 8-11
FCC registration 1-19
FXS and FXO interface modules 8-5
indicators 11-6
inserting interface modules 8-4
pin assignments 4-9
removing interface modules 8-3
terminal block 4-10
user's responsibility 1-18
Unpacking Passport 4400 unit 2-3
User's responsibility
Analog Voice Module 1-18
E1 Voice Module 1-16
T1 CSU/DSU Interface Module 1-12
Universal Analog Voice Module 1-18

V

Verifying operation 2-7

W

WAN Serial Interface Module 5-3
agency compliances 1-11
Warnings iii

Passport 4400

Hardware Installation Manual

Address comments to:
Senior Manager, Technical Publications
Northern Telcom
MICOM Communications Corp.
4100 Los Angeles Ave.
Simi Valley, CA 93063-3397
U.S.A.
1-805-583-8600

© 1998 Northern Telecom
All rights reserved

Information subject to change without notice

Publication: 800-1951-20 Rev. A
Date: June 1998
Printed in Canada